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2020 年 7 月 20 至 8 月 5 日，清华大学天文系主任毛淑德教授应邀访问云南大学中国西南天文研究所，并分别于 7 月 22 日、24 日和 29 日为研究所及物理与天文学院师生作系列学术讲座。

毛淑德教授研究领域包括星系形成、星系动力学、引力透镜、系外行星搜寻等。此次访问中，他为师生们讲解了微引力透镜和强引力透镜物理机制及其在天文学中的应用，包括系外行星探测、暗物质研究等，并展望了未来的发展前景。系列讲座使同学们受益匪浅，师生就相关问题与毛淑德教授进行了深入交流。访问期间，毛淑德教授亦与研究所科研人员就不同科学合作课题展开了讨论。

From July 20 to August 5, 2020, Prof. Shude Mao from Tsinghua University visited SWIFAR and presented a series of lectures to the students and faculty on the topic of microlensing and strong lensing.

In the lectures, Prof. Mao first introduced the basic concepts of gravitational lensing and presented important applications of microlensing and strong lensing in astrophysics studies, including searching for exoplanets and probing the nature of dark matter. He also discussed future perspectives of the field. The lectures stimulated great interests amongst the students, who engaged in extensive discussions with Prof. Mao. During his stay, Prof. Mao also had fruitful discussions with the SWIFAR faculty members on different research topics and potential collaborative projects.

图 1.1：毛淑德教授为研究所及物理与天文学院师生作讲座

Prof. Shude Mao giving a special lecture to the faculty and students

✧ 毛淑德教授简介 Brief introduction of Prof. Shude Mao:

毛淑德教授于 1992 年获美国普林斯顿大学天体物理系博士学位。1992 年起至 1999 年先后在美国哈佛-史密松天体物理中心和德国马克斯普朗克天体物理研究所进行博士后研究工作。2000 年起受聘于英国曼彻斯特大学，先后任讲师、副教授及教授。2010 年至 2014 年任中国科学院国家天文台研究员和星系宇宙学部主任科学家，2014 年 10 月起任清华大学教授、天体物理中心主任、天文系主任。研究领域为星系形成、星系动力学、引力透镜、系外行星探测等。

Prof. Shude Mao is now a professor of astrophysics at Tsinghua University. He obtained his PhD degree at Princeton University in 1992 and conducted postdoctoral research at the Harvard-Smithsonian Center for Astrophysics and the Max-Planck Institute for astrophysics from 1992 to 1999. He was a faculty member of the University of Manchester from 2000 to 2009. In 2010, he returned to China as a research professor at NAOC. Since 2014, he has been a professor of astrophysics at Tsinghua University, and now is the director of the Department of Astronomy there. Prof. Mao’s research interests include galaxy formation, galactic dynamics, gravitational lensing, and extrasolar planets.

中科院上海天文台袁峰教授访问中国西南天文研究所

Prof. Feng Yuan from Shanghai Astronomical Observatory, CAS visited SWIFAR

2020 年 8 月 9 日至 13 日，中国科学院上海天文台副台长袁峰教授应邀访问云南大学中国西南天文研究所，并分别于 8 月 11 日和 12 日为研究所及物理与天文学院师生作系列学术讲座。

袁峰教授研究领域主要集中在黑洞和吸积盘，特别是利用相对论框架下的磁流体数值方法模拟吸积盘的物理过程及其与宿主星系的协同演化等问题。此次访问中，他为师生们讲解了吸积盘的基本物理过程及其对宿主星系演化的影响，着重介绍了其团组近年来利用计算机模拟对相关问题进行的深入研究和成果。师生们从中获益良多，并与袁峰教授进行了深入交流。访问期间，袁峰教授亦与研究所科研人员就不同科学课题和未来进一步合作展开了讨论。

From August 9 to August 13, 2020, Prof. Feng Yuan from Shanghai Astronomical Observatory, CAS, visited SWIFAR. He presented a lecture on AGN physics and a colloquium on numerical studies of AGN feedbacks.

In the lecture, Prof. Yuan introduced the basic concepts of AGN and accretion process to the students. In his colloquium, he focused on feedbacks arising from the accretion of supermassive black holes, which are believed to play a crucial role in galaxy evolution.   He showed their recent simulation studies. The lecture and colloquium were very well received, and stimulated extensive discussions. During his visit, Prof. Yuan also discussed with SWIFAR faculty members on potential collaborative projects.

✧ 袁峰教授简介 Brief introduction of Prof. Feng Yuan:

袁峰教授于 1997 年获得中国科学技术大学天体物理博士学位。之后分别于南京大学、德国马普射电天文所、哈佛大学和普渡大学从事博士后研究。2005 年加入上海天文台，现任上海台副台长。主要研究领域包括黑洞的吸积与喷流、活动星系核、星系演化等。

Feng Yuan is a professor at Shanghai Astronomical Observatory, Chinese Academy of Sciences. He obtained his Ph.D. in USTC in 1997, then worked at Nanjing University, Max-Planck Institute of Radio Astronomy in Germany, Harvard University, and Purdue University in the US as a postdoc. He joined Shanghai Astronomical Observatory in 2005 and now serves as the deputy director there. Prof. Yuan's research interests include physics of black hole accretion and outflow, active galactic nuclei, and galaxy evolution.

图 1.2：袁峰教授为研究所及物理与天文学院师生作讲座

Prof. Feng Yuan giving a special lecture to the faculty and students

亮点工作 Featured Science

云南大学中国西南天文研究所研究团队利用神经网络方法搜索强引力透镜系统

Searching strong lensing systems with the neural network technique

星系尺度的强引力透镜系统是重要的宇宙学探针，可用于深入地研究宇宙学和天体物理中的诸多科学问题，如暗物质性质、星系形成和演化以及哈勃常数的测量等。然而，目前已证认的强透镜系统数目过少，严重制约了相关天体物理学问题研究的开展。如何搜寻证认更多强透镜样本是当前工作中的主要问题。通过下一代大规模测光巡天项目的开展，人们期待发现数以万计的强透镜系统。但如何在海量的天体图像中快速地找到强透镜候选体？

近年来，人工智能的快速发展给我们提供了一种新的可能。国际上已有相关研究团队利用卷积神经网络方法搜索强引力透镜系统。在此基础上，云南大学中国西南天文研究所的宇宙学团组构建并训练了一个卷积神经网络，并将其应用于欧洲南方天文台 2.6 米巡天望远镜（VST）千平方度巡天（Kilo-Degree Survey—KiDS）数据，发现了 38 个新的强透镜候选体。此外，通过测试卷积神经网络在不同观测条件上的表现以及用不同大小的训练集训练网络，该小组还对卷积神经网络的稳定性作了测试。该项工作构建的神经网络可应用于未来的其他巡天数据，如正在建设中的云南大学多通道测光巡天望远镜（Mephisto）的数据。

该项研究工作已在国际天文学主流期刊《英国皇家天文学会月刊》发表，论文第一作者是研究所硕士生何紫朝，指导老师为尔欣中教授和范祖辉教授（文章链接：https://academic.oup.com/mnras/article/497/1/556/5869256）。

图 1.3：新发现的 38 个强透镜候选体其中 4 个的图像

Images of 4 out of the 38 newly identified strong lensing candidates

Galaxy-scale strong gravitational lensing systems serve as one of the most important probes to study a variety of problems in cosmology and astrophysics. For example, it allows us to probe the dark matter halos of galaxies, study the formation and evolution of galaxies, as well as to estimate the Hubble constant. However, the currently very limited samples of confirmed strong lenses have become the major bottleneck of such studies. With data from the next generation surveys, one expects to find tens of thousands strong lensing systems. Yet, how to identify robustly and efficiently strong lenses from the huge amount of imaging data?

The development of technique Convolutional Neural Network (CNN) has made rapid progress in recent years. The technique has been successfully applied to a variety of astronomical problems. The cosmology group at SWIFAR has constructed a CNN trained by simulated images of strong lensing systems. With this Network, they have identified 38 new strong lensing candidates in the KiDS (Kilo-Degree Survey) data collected with the European Southern Obervatory (ESO) 2.6 meter VLT Survey Telescope (VST). Moreover, the robustness of the CNN has been tested with respect to variations in the point spread function (PSF), training sample etc. The Network constructed in the current work has the potential to be applied to data of future surveys including that to be carried out by the Multi-channel Photometric Survey Telescope (Mephisto) currently being developed at SWIFAR.

The work has been published by the MNRAS (He et al. 2020; MNRAS, 497, 556). The leading author of the paper, Mr. Zizhao He, is an M.Sc student of SWIFAR under the supervision of Profs. Xinzhong Er and Zuhui Fan (https://academic.oup.com/mnras/article/497/1/556/5869256).

LAMOST 首次发布视向速度变源星表

The first release of a catalog of RV variable star candidates from LAMOST

近日，云南大学田志佳博士、刘晓为教授，北京师范大学苑海波副教授等人分析了 LAMOST DR4 数据中的重复观测源，根据视向速度的变化与观测误差的关系，估计了恒星为视向速度变源的概率，并首次建立了包含约 8 万颗恒星的视向速度变源星表。

视向速度变源包含脉动变星、双星等内在变源和外在变源。视向速度变源中的双星系统，通过轨道求解可以精确确定恒星参数，进而对恒星内部的物理过程进行限制；同时，通过伴星的视

向速度变化可以对双星系统中的白矮星、中子星、黑洞等致密天体进行探测；一些特殊恒星的形成可以利用双星演化模型解释，如 Ia 型超新星起源于白矮星对其伴星的物质吸积；此外，双星对星族合成的研究也具有重要意义。

位于赫罗图上不稳定带的脉动变星，如天琴座 RR 型变星（RR Lyrae），造父变星（Cepheid）等，伴随其周期性的收缩与膨胀，其视向速度也会呈现出周期性变化特征。脉动变星具有很好的光变周期与光度（绝对星等）的关系——即周光关系，可以作为宇宙的探针，精确测定距离。因此，获取脉动变星、双星等在内的视向速度变源星表具有重要的科学意义。

该成果充分利用了 LAMOST 大样本数据的优势，在国际上建立了首个基于低分辨率光谱巡天数据的视向速度变源候选体星表。该星表包含约 8 万颗恒星，其中包括 77%的双星系统和 7%的脉动变星，样本纯净度高于 80%。随着 LAMOST、Gaia 等巡天项目的开展，越来越多的变源将被确认和分类。作为变源巡天的输入星表，这个视向速度变源星表成为了 LAMOST DR4 数据中增值星表之一，具有重要的科学价值。

该星表公开发布在 http://dr4.lamost.org/v2/doc/vac，供研究人员使用。

文章链接：https://iopscience.iop.org/article/10.3847/1538-4365/ab9904。

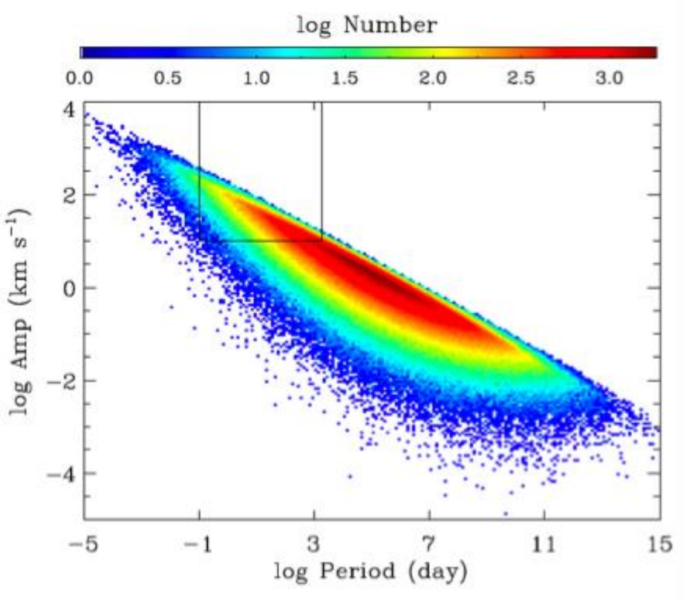


图 1.4：模拟双星样本的周期-振幅联合分布特征。黑色方框标出了 LAMOST 可探测双星
The joint distribution of periods and amplitudes for the mock binaries. The box marks out the detection limit based on the LAMOST’s capability

A group led by researchers from Yunnan University has analyzed a large number of multi-epoch spectra obtained with the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST), and estimated the probabilities of the targets being radial velocity (RV) variables. The analysis yields a catalog containing 80,702 RV variable candidates with probability greater than 0.60 based on the LAMOST DR4.

RV variable stars include intrinsic (e.g., pulsating stars) and extrinsic (e.g., binaries) variables. Amongst the 80,702 cataloged variables, 77% are binaries and 7% pulsating stars, with a purity higher than 80%.

The catalog, as a value-added catalog for the LAMOST DR4, and released following the LAMOST Data Policy, is publicly available at http://dr4.lamost.org/v2/doc/vac.

The paper has been published in The Astrophysical Journal Supplement Series (https://iopscience.iop.org/article/10.3847/1538-4365/ab9904). Dr. Zhijia Tian is the lead author, and Dr. Zhijia Tian and Prof. Xiaowei Liu the corresponding authors.

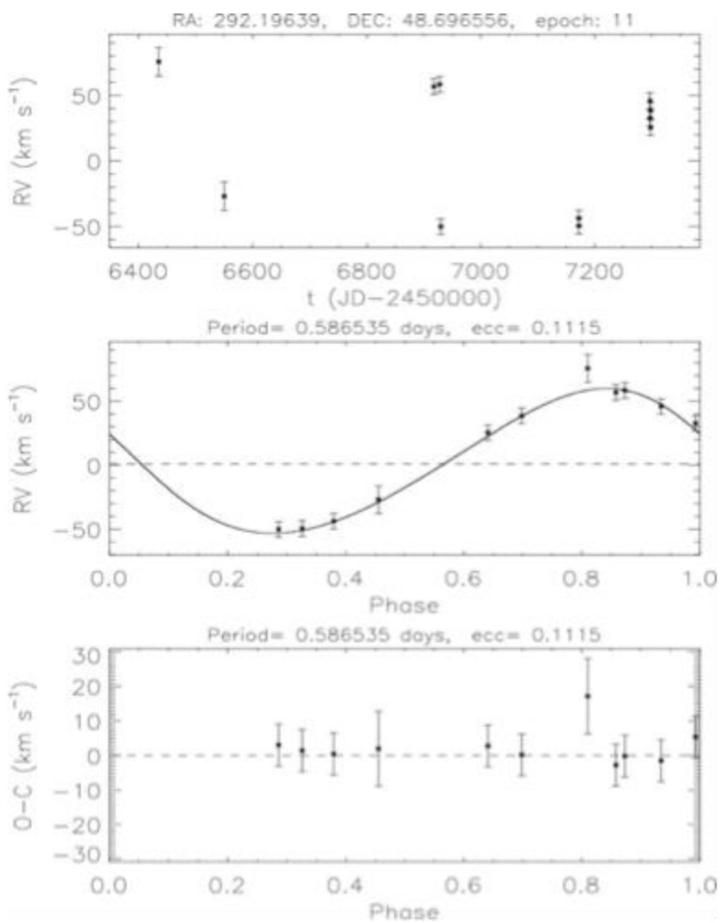


图 1.5：LAMOST 对食双星 KIC 11084782 视向速度的观测，其周期来自 Kepler 的测光观测，视向速度来自 LAMOST 的光谱观测。上、中、下三图分别表示视向速度随时间、双星轨道相位的变化以及拟合的残差
The comparison of RVs between observations and fittings for KIC 11084782. The top panel shows the observed RVs against time. The observed (dots with error bars) and fitted (solid line) RVs against phases are plotted in the middle panel, and the residuals (O−C) are plotted in the bottom panel

云南大学中国西南天文研究所研究团队发布 LAMOST 和 Gaia 的红团簇星样本并利用该样本取得系列重要进展

Mapping the Galactic Disk with the LAMOST and Gaia Red Clump Sample

近日，云南大学黄样副教授、刘晓为教授，牛津大学 Ralph Schonrich 博士，北京大学张华伟副教授等人基于 LAMOST DR4 光谱数据和 Gaia DR2 自行数据构建并发布了近 14 万颗主红团簇星的精确距离、质量、年龄和三维速度信息。这些数据对于许多重要前沿课题的研究具有重要的

价值，目前已在银盘的速度场、外盘翘曲起源及星族起源等研究中发挥了作用，同时该样本将成为 LAMOST 巡天数据资源中非常重要的一部分，供国际同行使用。该成果发表在国际知名天文期刊《天体物理学报增刊》（Huang et al. 2020, ApJS, 249, 29）。

主红团簇星是中小质量恒星的氦主序阶段，它作为研究银河系（特别是银盘）的示踪体有如下优势：1）主红团簇星被认为是标准“烛光”，其距离精度高达 5%-10%；2）主红团簇星的绝对星等比较亮，在 LAMOST 极限星等下可允许我们对银盘体积进行研究；（3）通过从 LAMOST 光谱中提取的恒星参数可以以较高的完备度和较低的污染率挑选出主红团簇星；（4）由于巨星经历过挖掘过程，可从光谱中的谱线特征得到主红团簇星的质量和年龄信息。基于以上优势，黄样等人从 LAMOST DR4 光谱数据中成功筛选出 14 万主红团簇巨星，利用 Gaia DR2 的三角视差信息对红团簇星进行绝对星等定标，得到了这些星的精确距离（5%-10%），并利用 KPCA 方法得到了这些星的质量（10%-15%）和年龄（20%-30%），结合 Gaia DR2 的自行信息进一步得到了 14 万主红团簇巨星的三维速度信息。该样本覆盖了银盘相当大的体积（如图 1.6）：$4 < R < 16$ kpc, $|Z| < 5$ kpc, $-20 < phi < 50°$。

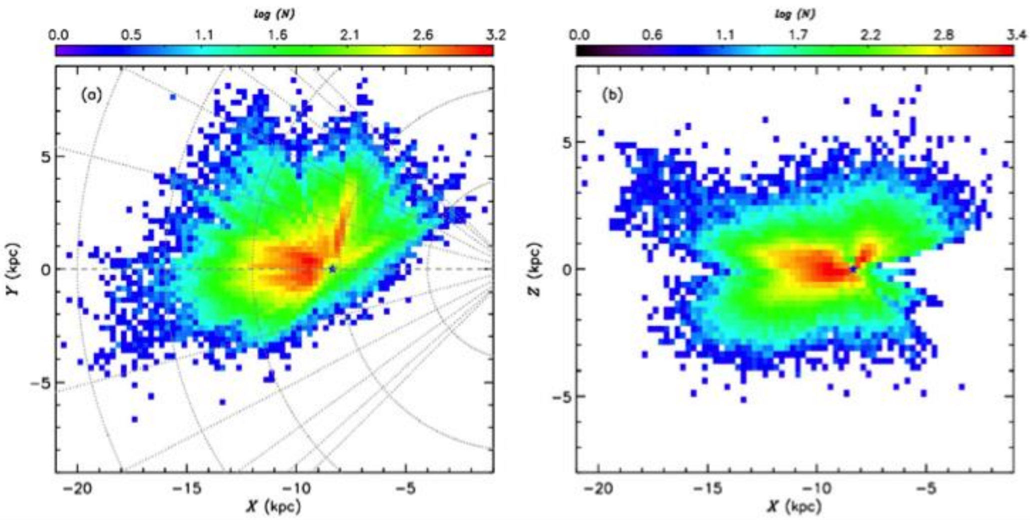


图 1.6：基于 LAMOST 和 Gaia 的主红团簇星样本的空间分布

Number density distribution of our primary RC sample stars in the X–Y (the left panel) and X–Z (the right panel) planes

利用该样本，云南大学研究团队在理解银盘的速度场、外盘的翘曲以及特殊星族起源上取得了系列重要进展。具体如下：

一、银盘翘曲的运动学信号及视向节点角度的测量

旋涡星系的外盘普遍存在翘曲现象。作为一个典型的旋涡星系，上世纪 60 年代的射电观测揭示银河系外盘也存在显著的翘曲。随后通过对不同示踪物（如尘埃、恒星盘等）的观测进一步证实了银盘翘曲的存在。翘曲产生机制的理论有很多，如银河系卫星星系对银盘的扰动，内落气体的吸积等。要从观测上厘清银盘翘曲的成因不仅需要我们有对翘曲结构性质的了解，还需要我们从运动学上探测到翘曲信号加以限制。然而，银盘翘曲的运动学研究受限于银河系恒星自行精度的影响，在 Gaia DR2 释放之前的研究都是有限的。即使在 Gaia DR2 释放之后，受限于 Gaia 三角视差的精度，只能对外盘 2-3 kpc 内的翘曲信号进行探测。得益于本研究团队发布的红团簇星的精确距离测量，李新意等人首次对银盘外围远至 4-5 kpc 内的翘曲信号进行细致研究，并发现翘曲信号随方位角有显著变化，进而首次在运动学空间得到了银盘翘曲的视向节点角度（angle of line-of-node）为 12.5 度左右（图 1.7），这与恒星计数法得到的结果高度一致。下一步，研究团队计划结合恒星计数和运动学来探究银盘翘曲的成因。

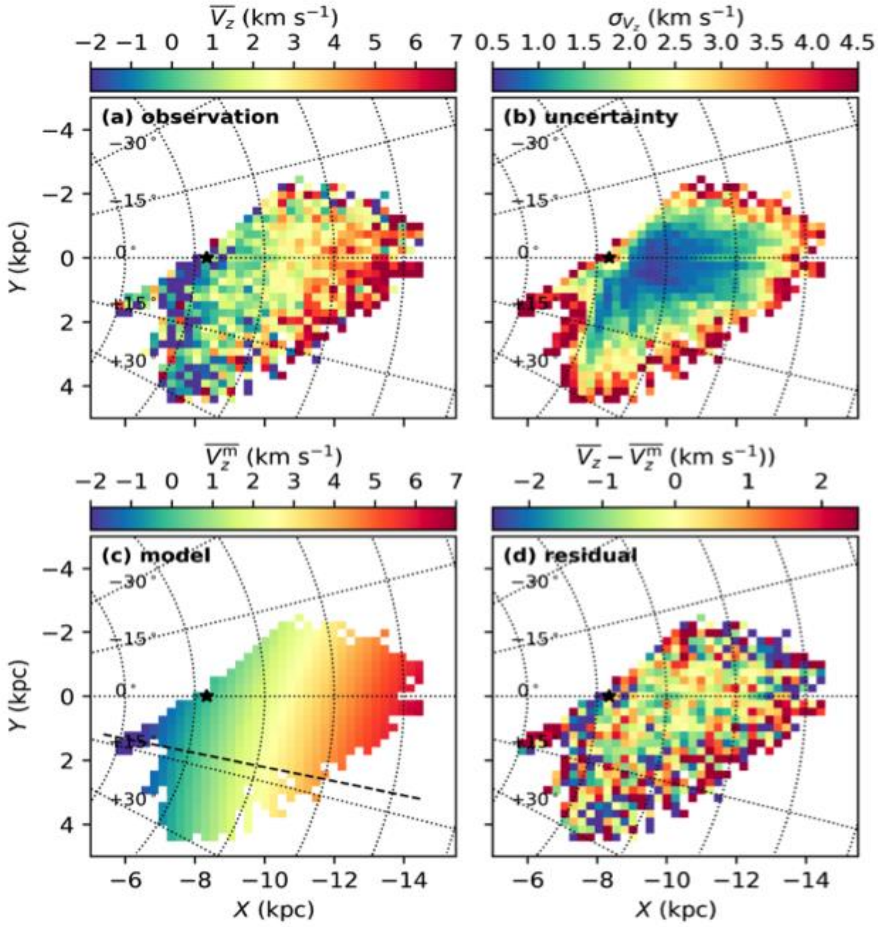


图 1.7：利用 LAMOST 和 Gaia 的红团簇星样本绘制的银盘平均垂向速度在盘平面上的分布及利用简单翘曲模型对平均垂向速度的拟合 Distributions of mean vertical velocities in the X-Y plane

二、揭示特殊星族的起源

按照标准的银河系化学演化模型，早期诞生的盘星主要经历 alpha 元素增丰（大质量恒星死亡爆发的 II 型超新星的贡献），而金属丰度相对较低。后期，大质量恒星死亡殆尽，由小质量恒星死亡演化产物 Ia 型超新星主要贡献铁族元素增丰，而 alpha 元素相对变低。然而，最近基于星震学测量的年龄和大规模光谱巡天得到的 alpha 元素丰度，发现银盘上存在一族较为年轻（小于 4-6 Gyr）的 alpha 元素增丰（[alpha/Fe] > 0.15 dex）恒星，这些恒星显然不符合标准的银河系化学演化模型预言。目前关于这类特殊星族的起源有两种解释：一是这些星族的恒星成员起源于一类早期保存下来未受 Ia 型超新星增丰污染的原处气体环境；另一类是这些恒星很可能是双星吸积或并合演化的产物。区分这两种模型的关键是这些恒星是否真的年轻（前者模型下这些星是真的年轻，而后者实则是年老）。获知这些恒星的整体结构、化学以及运动学信息成为区分该族恒星是否年老的关键。由于样本数目的限制，前人的工作无法对这类星族的结构、化学和运动学性质进行统计性分析。黄样所在团队构建的主红团簇星大样本为研究这些工作提供了极佳的资源，孙伟祥等人从中筛选出了超过 2000 颗的该族恒星，通过对这些星的统计学研究发现，该类星族的结构、化学和运动学性质与传统的厚盘星性质几乎一致（图 1.8），表明这些星并非真的年轻而实际上相当年老。基于此，研究团队最终揭示了该星族很可能起源于双星吸积或并合演化的产物。

此外，云南大学王海峰博士基于该样本已发表了 3 篇关于银盘速度场受扰动的文章。

截至目前，本研究团队基于该样本已被国际知名天文期刊《天体物理学报》（APJ）、《天体物理学报增刊》（ApJS）及英国《皇家天文学会月刊》（MNRAS）正式发表和接收文章 6 篇，这些成果的取得都表明了这个具有丰富信息的主红团簇星大样本在刻画银盘计划中的非凡价值和广阔的应用前景。

系列成果的论文链接如下：

https://ui.adsabs.harvard.edu/abs/2020ApJS..249...29H/abstract
https://ui.adsabs.harvard.edu/abs/2020MNRAS.491.2104W/abstract
https://ui.adsabs.harvard.edu/abs/2019ApJ...884..135W/abstract
https://ui.adsabs.harvard.edu/abs/2020ApJ...901...56L/abstract
https://ui.adsabs.harvard.edu/abs/2020ApJ...897..119W/abstract
https://ui.adsabs.harvard.edu/abs/2020arXiv200810218S/abstract

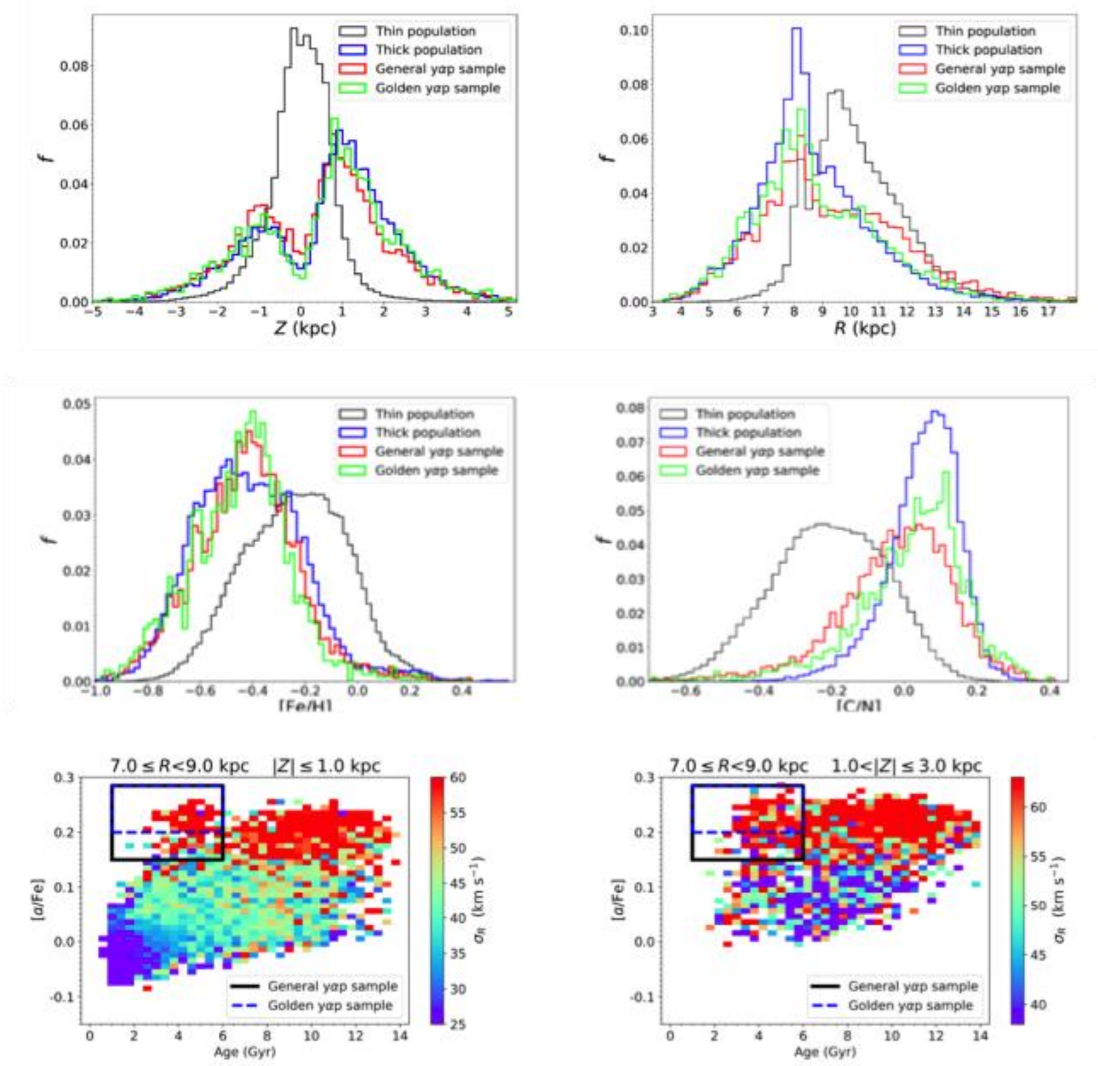


图 1.8：“年轻”[alpha/Fe]增丰星族的结构（上图）、化学（中图）及运动学（下图）与传统化学薄厚盘的比较 The spatial distributions (the top panel), chemical distributions (the middle panel) and kinematic properties (the bottom panel) of the “young” [alpha/Fe] enhanced, chemically thin and thick disk populations

Primary red clump (RC) stars are metal-rich low-mass stars of intermediate to old age in the core helium-burning phase (ignited degenerately). They are widely used as distance indicators given their quite stable luminosities that are weakly dependent on chemical composition and age. As standard candles widely distributed across the entire Galactic disk, RCs are excellent tracers to explore the three-dimensional structure, study the chemical and kinematic properties, and unravel the assemblage history of the Galactic disk.

Based on stellar atmospheric parameters deduced with the latest version of LSP3 for whole LAMOST DR4, nearly 140,000 primary RC stars of spectral S/Ns higher than 20 have been successfully singled out. The stellar masses and ages of those stars are further determined from the LAMOST spectra, using the kernel principal component analysis (KPCA) method and are trained with thousands of RCs in the LAMOST–Kepler fields with accurate asteroseismic mass measurements. Various tests show typical uncertainties of 15% and 30%, respectively, for the estimated masses and ages. Using over 10,000 primary RCs with accurate distance measurements from the Gaia DR2 parallaxes, the Ks–band absolute magnitudes of the primary RC are recalibrated by considering the effects of both metallicity and age, for the first time. With this new calibration, very accurate distances are derived for the whole sample, with typical uncertainties of 5%–10%, which are even better than the Gaia measurements for stars beyond 3–4 kpc.

The sample covers a significant volume of the Galactic disk of $4 < R < 16$ kpc, $|Z| < 5$ kpc, $-20 < \text{phi} < 50°$. Stellar parameters, line-of-sight velocities, and elemental abundances deduced from the LAMOST spectra and proper motions from the Gaia DR2 are also provided in the whole sample stars. The sample is of vital importance to probe the structural, chemical, and kinematic properties of the Galactic disk(s) and is available at https://zenodo.org/deposit/3875974. The paper has been published in The Astrophysical Journal Supplement Series (Huang et al. 2020, ApJS, 249, 29).

Based on the above RC sample, the YUN team has made progresses on the velocity field of the Galactic disk, the disk warp and the origin of the "young" [alpha/Fe] enhanced population:

1. The kinematic signature of the Galactic warp

Disk warping in the outer regions of spiral galaxies (>50%) is a very common phenomenon. Being a typical spiral galaxy, the Milky Way also shows clear warp in the outer disk. The Galactic warp was first detected by Kerr (1957) with H I 21-cm line observation. Not only the neutral gas, other components of the Galactic disk also show that the Galactic outer disk is strongly warped, including the stars, the molecular clouds and the interstellar dust grains. Theoretically, warping of a spiral galaxy is generally interpreted as the response of the disk to perturbations. While many scenarios have been proposed, the exact origin of the Galactic warp remains unclear. Further information of the kinematic signature of the Galactic warp would be invaluable to clarify the situation. Prior to the Gaia data release, several studies attempted to unravel the kinematic signature of the Galactic warp, but their results are inconclusive due to the limited accuracy of proper motions employed. With Gaia data release, the kinematic signal of the Galactic disk has been clearly detected, while more detail 2D map is still limited to the distance derived from the Gaia parallax. By using RC sample with accurate 3D position and 3D velocity measurements, the YNU team has explored the kinematic warp signature of the Galactic disk(s) in the Galactic plane. For the thin disk population, a clear positive gradient of mean vertical velocity as a function of R. The warp signature for the thick disk population is much weaker, largely due to the hot nature of orbits of thick disk stars. For the thin disk stars, we further explore the variations of mean vertical velocity (as a function of R) for the different azimuthal slices and find the amplitude of warp increases with azimuthal angle and reaches a maximum in slice between 10 and 17 deg. To quantitively determine the angle of line-of-node of the warp, we fit the distribution of mean vertical velocities of the thin disk stars with a long-lived static warp model and find an angle around 12.5◦, in excellent agreement with the previous estimates from star counting.

2. On the origin of the "young" alpha enhanced stars

The classical Galactic chemical evolution (GCE) models predict strong correlations amongst stellar metallicity [Fe/H], [alpha/Fe] abundance ratio and age for disk stars, as a result of the different histories of element enrichment and star formation rate. Generally, thick disk stars were born at the early stage (thus very old) and experienced elements enrichment as a product of the core collapse supernovae (SNe) of massive stars. The thin disk stars are typically much younger with iron-peak elements enriched mainly by Type Ia SNe (thus with high [Fe/H] and depressed [alpha/Fe]). However, this paradigm has recently been challenged by analyses of sample stars beyond the solar neighbourhood (> 100 pc) that have robust age determinations, owing to the precise asteroseismic measurements from the CoRoT and Kepler satellites. By combining the asteroseismic ages and [alpha/Fe] abundance ratios given by the APOGEE medium-to-high resolution spectroscopic surveys, Chiappini et al. (2015) and Martig et al. (2015) first found a handful stars with enhanced [alpha/Fe] abundance ratios ([alpha/Fe]> 0.1 dex) but of young ages (< 6.0 Gyr). The existence of this intriguing group of stars has been confirmed by the follow-up work. Those "young" [alpha/Fe]-enhanced stars are certainly unexpected from the classical GCE models. The origin of those "young" [alpha/Fe]-enhanced stars is still an open question. Hitherto, two possible explanations have been proposed. The first one is that those stars are evolved blue stragglers and their true ages have been underestimated because of the large current masses that result from the merger or mass transfer. The second scenario is that those stars are newly formed in a recent pristine gas (not polluted by SNe Ia ejecta) accretion episode at some particular positions of the Galaxy. The key to distinguishing the two scenarios is finding alternative independent age indicators to check that those "young" [alpha/Fe]-enhanced stars are on earth young or old.

By using the RC sample, The YNU team has identified a large sample of "young" [alpha/Fe]-enhanced stars of ages younger than 6.0 Gyr and [alpha/Fe] values greater than 0.15 dex. To explore their possible origins, the team has analyzed their spatial distribution, and the chemical and kinematic properties and compared the results with those of the chemically thin and thick disk populations. The team finds that the aforementioned properties of the "young" [alpha/Fe]-enhanced sample stars are almost the same as those of the chemically thick disk population. The results support the idea that these stars are not really young but genuinely old, and therefore prefer stellar merger or mass transfer as their most likely origin.

So far, six papers based on the RC sample have been accepted by the professional astronomical journals: The Astrophysical Journal (ApJ), The Astrophysical Journal Supplement (ApJS) and Monthly Notices of the Royal Astronomical Society (MNRAS).

The links to those papers are:

https://ui.adsabs.harvard.edu/abs/2020ApJS..249...29H/abstract
https://ui.adsabs.harvard.edu/abs/2020MNRAS.491.2104W/abstract
https://ui.adsabs.harvard.edu/abs/2019ApJ...884..135W/abstract
https://ui.adsabs.harvard.edu/abs/2020ApJ...901...56L/abstract
https://ui.adsabs.harvard.edu/abs/2020ApJ...897..119W/abstract
https://ui.adsabs.harvard.edu/abs/2020arXiv200810218S/abstract

科研总结 Research Summary

研究所成立3年以来，依托国内外大科学装置开展科学研究，在星系宇宙学、高能天体物理、银河系与近邻宇宙 3 个优势学科方向产出了一批原创性成果，获批国家级科研项目方面表现突出。3年来，天文学科发表专业学术期刊论文89篇（第一作者或通讯作者论文50篇）；申报国家自然科学基金15项，获批12项，含重点项目2项。

Since the establishment of SWIFAR three years ago, the Institute has relied on domestic and foreign scientific installations to carry out scientific researches and obtained a multitude of original achievements in cosmology and structure formation, high-energy astrophysics, and the Milky Way and the Local group, achieving outstanding performance in national grant applications. In the past three years, 89 papers have been published in professional academic journals (50 as first author or corresponding author); 15 grant applications have been submitted to the National Natural Science Foundation of China (NSFC), among which 12 were awarded, including 2 of Key Program.

二、 科普介绍 Popular Science

中秋话月明 The Moon

“床前明月光，疑是地上霜”— 李白《静夜思》

“海上生明月， 天涯共此时”— 张九龄《望月怀远》

“今夜月明人尽望，不知秋思落谁家”— 王建《十五夜望月寄杜郎中》

一轮明月，承载着人们无尽的情思：或异乡怀亲，或寄情佳人，或铁马戎疆。千百年来，月亮深深地影响着人们生活的方方面面，包括宗教、历法以及文化等。而作为与地球休戚与共的唯一一颗卫星，月亮对地球生态的影响也尤为显著。适值中秋，我们便聊一聊关于月亮的两三事。

The Moon carries countless emotions of people, homesick, love knot, or battlefield. For thousands of years, the Moon has profoundly affected the lives of people in many aspects, such as religion, calendar and culture etc. As the only guardian of the Earth, the Moon has a significant impact on the ecology of the Earth. As the Middle autumn day is coming, let us talk about the Moon.

✧ 一些关于月球的数据 Some basics of the Moon

月亮，专业称呼为月球，其平均半径为 1700 千米，大约是地球的 1/4；其质量仅为地球的 1/80。月球距地球的平均轨道半径为 38.44 万千米，绕地球运动的公转周期为 27.3 天。

Moon, or luna, the radius is 1700 km, which is only a quarter as that of the Earth, but the mass of the Moon is only 1/80. The average distance between the Earth and the Moon is about 38.44 km, and its period revolution is 27.3 days.

月球具有分层结构，从内至外可分为月核、月幔、月壳。月球的亮度主要来自对太阳光的反射。月球表面较亮的区域为山脉，而较暗区域则为平原或者盆地，通常称之为月陆和月海。与此同时，月球表面布满了环形山（或撞击坑），呈环形隆起的低洼地形。环形山主要是由于小行星撞击或火山爆发而形成的火山喷发口。通过分析月球上的岩石，科学家推断出月球形成于距今 45.1 亿年以前。目前，人们普遍认为月球是由于一颗与火星尺寸相当的天体与原初地球碰撞产生的。

The Moon has a layered structure, from outmost to the innermost is the lunar crust, lunar mantle, lunar core. The Moon looks bright because it can reflect the light from the Sun. On the surface of the Moon, the bright area is mountain ranges, the dark area is plain or basin, which usually dubbed as the lunar mare and lunar sea. Meanwhile, there are full of ring mountain or craters on the surface. They are probably originated from the collision of asteroids or the volcanic vent. By analysis the rock from the Moon, scientists conclude that the Moon formed 4.5 billion years ago. In the popular theory nowadays, we think that the Moon birth from a collision between the primitive Earth and a Mars-sized celestial body.

地球和月球的引力相互作用深刻影响着彼此的演化。时至今日，两者之间仍存在诸多微妙的关联，以致产生许多令人惊奇的观测现象。

The gravity between the Earth and the Moon has a profound impact on each other and the evolution of both two. Even today, there exists several subtle relations and thus amazing phenomena.

✧ 为什么会有潮汐？ Tides

由于地球和月球都存在一定的体积，它们之间的引力会产生潮汐现象，其中最显著的例子就是海水的自然涨落。随着地球的自转和月球的公转，每间隔 12 小时 25 分钟发生一次涨潮。有趣的是，海洋潮汐作用力与地球自转的方向相反。有证据表明，尽管该作用力极其微弱，但长期积累下来，地球的自转周期却越来越慢，即一天的时间越来越长，大约几年便会增加 1 秒。与此同时，地球的反作用力也使得月球缓慢地远离地球，每一年远离约 3.8 厘米。

Because both the Earth and the Moon has a finite size, the gravity between them will cause tidal effects. The most remarkable one is the tides of the ocean. Due to the autorotation of the Earth and revolution of the Moon, there is a high tide every 12 hours 25 minutes. The interesting point is the tides of the ocean will counteractive the autorotation of the Earth. There is evidence that although such an effect is extremely tiny, the accumulation slows down the autorotation of the Earth. The period of a day becomes slight longer, by one second every few years. At the same time, counterforce will push the Moon slowly, by 3.8 centimetres per year.

✧ 什么是潮汐锁定现象？ Tidal lock

当我们观看月球时，会发现月球总是一面朝着我们，另一面我们却从来没有见过。为什么月球看起来相对地球没有自转呢？实际上，像地球一样，月球不仅绕着地球公转，它自身也是有自转的。但经过长时间的演化，在地球引力的作用下，月球的自转周期变得与其公转周期一样，这种现象称为潮汐锁定，它是太阳系中的卫星普遍具有的性质。对于月球而言，由于地球引力导致的“天平动”效应，我们实际可以看到 59%的月面。

When you watch the Moon, have you ever found that we always see the one side of the Moon, and we have never seen the other side? Why there is “no autorotation” of the Moon respect to the Earth. In fact, like the Earth, the Moon has both autorotation and revolution. But with many years of evolution, the gravity from the Earth had made the autorotation and revolution of the Moon synchronous. This is called the tidal lock. Most of the satellites in the solar system have the same properties. For the Moon, due to the libration of the Moon, we can see 59% of the surface of the Moon in reality.

✧ 月食现象是怎么发生的？ Lunar eclipse

当月球绕转到日地中间，且三者几乎在一条直线时，会发生日食现象；而当地球处在日月之间时，则会发生月食现象。月球的视大小与太阳几乎相同，且由于月球的轨道是椭圆轨道，所以日食时会出现日全食或日环食。而当地球不完全在日月连线上时，则会发生日偏食现象。

When the Moon moves between the Earth and the Sun, and the three bodies perfectly align, the eclipse happens. And when the Earth is between the Moon and the Sun, the lunar eclipse happens. The apparent size of the Moon is almost the same as the Sun, but since the obit of the Moon is elliptical, then there are sometimes total solar eclipse and sometimes annular solar eclipse. And when the align is not perfect, a partial solar eclipse occurs.

类似地，月食可分为月全食、月偏食和半影月食。月全食时，地球会将太阳辐射到月球的光线全部遮挡。但由于地球大气的折射，部分太阳光线仍会照射到月球表面，这些折射光主要是红光。因此，月全食时我们经常会看到血月现象。

In the same way, there are total lunar eclipse, partial lunar eclipse and penumbral lunar eclipse. In total lunar eclipses, the Earth will shadow al the solar radiation. But due to the reflection of the atmosphere from the Earth, some solar radiation can still reach the surface of the Moon. Most of the reflected light is red. Thus, we often see the blood Moon.

地月之间的关系对人类文明的影响极其深远。从中国古代的宗教崇拜、占星术、历法的制定以及各类文学作品中即可见一斑。为了对月球有更深入的了解，人类自 20 世纪起便开始了频繁的登月之旅，如美国的阿波罗登月计划、中国的嫦娥登月计划等。月路漫漫，承载的不仅仅是人类的好奇之心，更是人类对科技发展、对未来生活的美好追求。

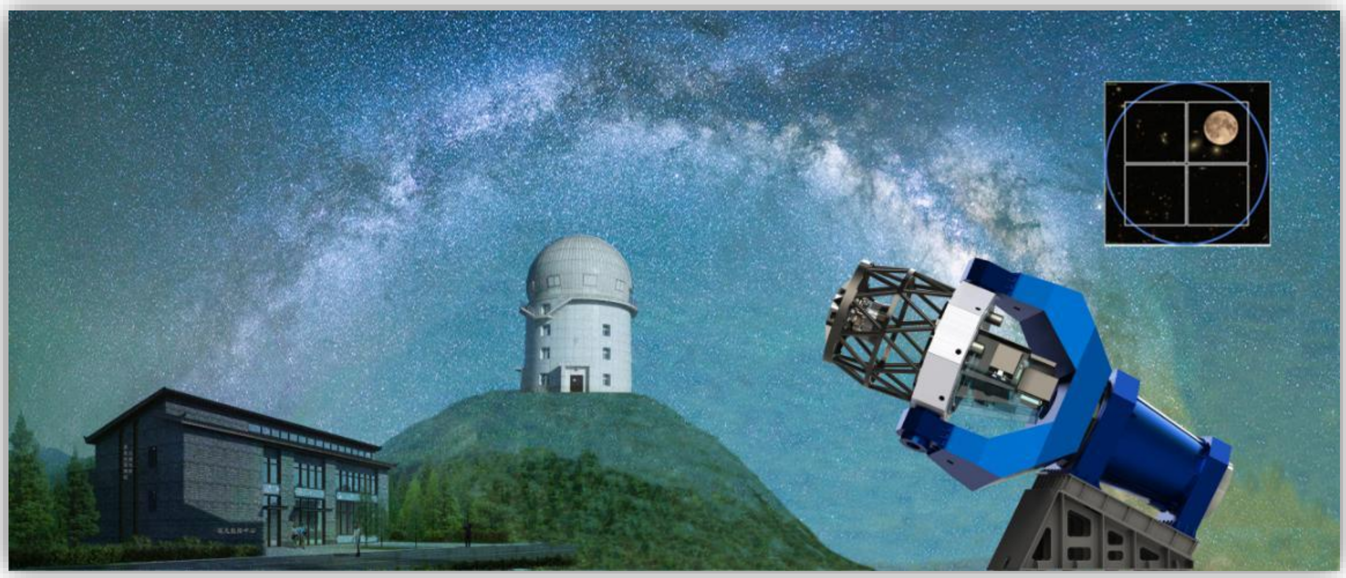
The relation between the Earth and the Moon has a profound impact on the civilization of the human being. One can see that from the ancient Chinese religion, astrology, calendar, and lots of literary. To better understand the Moon, people initiate Moon landing projects, such as Project Apollo, Chang'e Moon Landing Project, etc. They carry not only the curiosity of human being, but also the pursuit of development and future life.

（云南大学中国西南天文研究所刘德子博士后、尔欣中教授供稿）

(Contributed by Postdoctoral Fellow Dezi Liu and Professor Xinzhong Er of SWIFAR)

三、　平台建设 Platform Development

云南大学1.6米多通道测光巡天望远镜项目 The MEPHISTO Project



天文学以科学为导向、观测为基础、发现为驱动。大天区面积高精度多波段成像测光巡天已成为发现和探索新天体、新现象，深入研究各类天体性质及其形成和演化的最重要的天文学研究手段。至今，所有国内外的大视场巡天计划均只能在同一时间对观测天区进行单一波段成像，无法获取天体的实时颜色信息，“拍摄”的仅仅是天体运动、变化的“黑白影片”或“伪彩色影片”。开展变源、暂现源研究的瓶颈在于获取高精度的实时颜色信息以对其各类候选体进行快速分类与证认，而现有巡天均无法有效解决该难题。

Large-scale astronomical surveys play a key role in modern astrophysical studies, leading to new discoveries and revolutionizing our understanding of the origin and evolution of the universe. The fast-technological advances are changing the ways we view the sky, from snapshot taking in surveys such as SDSS and XSTPS-GAC to movie shooting by observing the same sky thousands of times in surveys, such as ZTF, SkyMapper, WFST, and LSST. The developments open up the possibility of probing the universe in multi-dimensions, particularly in the time domain.

在充分调研国内外已有和计划中的观测设施的基础上，紧扣科学前沿，以云南大学中国西南天文研究所刘晓为教授为首的团队提出建设 1.6 米多通道测光巡天望远镜(Multi-channel Photometric Survey Telescope，简称 Mephisto)。该项目作为云南大学天文一流学科建设的重点项目，经国内外专家多轮科学目标和技术方案论证，于 2018 年 1 月 11 日校长办公会审议通过正式立项，预算经费 1.648 亿，由学校一流大学建设专项经费给予全额支持。

Built upon the experiences of those surveys and to make a step forward, led by Prof. Xiaowei Liu, the director of South-Western Institute For Astronomy Research, Yunnan University, we plan to build a wide-field multi-channel survey telescope -- the Multi-channel Photometric Survey Telescope

(Mephisto), the first of this type in the world. As a key project in Yunnan University Development Plan for World-Class Astronomy Discipline, the project was formally approved by the president's council on January 11, 2018, after many rounds of scientific objectives and technical proposals demonstrated by experts at home and abroad. The budget is 164.8 million yuan, which is fully supported by the special fund of the Yunnan University Development Plan for World-Class University.

Mephisto 是国际上首台大视场、大口径、多通道高精度成像巡天望远镜，主镜口径 1.6 米，视场 3.14 平方度，首次通过创新性设计实现三通道分光，配备三台超大靶面拼接 CCD 相机，系国内首例，总像素高达 10 亿。其独特优势在于可同时在三个波段（ugi 或 vrz）对同一天区进行高质量成像观测，获取天体高精度实时颜色信息，录制宇宙天体运动和变化的彩色纪录片。

Mephisto has a 1.6 m primary and is equipped with three CCD cameras of a field-of-view 3.14 deg^2, capable of simultaneously imaging the same patch of sky in three bands (ugi or vrz). The three cameras boast a total of 1.0 Giga pixels. Mephisto will yield real-time colours of astronomical objects with unprecedented accuracies and deliver for the first time a coloured documentary of our evolving universe.

望远镜建成后将开展北半球多波段多历元测光巡天，并针对多个天区进行采样频率为天、小时以及分钟量级的变源与暂现源巡天，在国际上首次生成高精度真彩色天图，提供海量天体多波段星等与颜色变化的宝贵传世数据，预期在时域天文学、星系宇宙学、银河系考古学及近场宇宙学、太阳系及系外行星系统等基础前沿领域取得重大原创成果，培养一批优秀科研人才。届时，Mephisto 将与其他国家大科学装置一起，形成我国多波段、多信使实测天文观测设施群，提升云南大学乃至中国天文研究的国际竞争力。

The Mephisto will provide legacy data of multi-band magnitudes and colours for celestial objects, with two components surveys: the Mephisto-W covering the whole northern sky and the Mephisto-D, Mephisto-H and Mephisto-M covering sky areas of respectively thousands, hundreds and tens of square degrees with a corresponding cadence of days, hours and minutes, targeting specifically fast variables and transients. The unique capability of recording high-precision real-time colours, thus allowing quick and robust classification of fast transients, makes Mephisto particularly powerful for time-domain astrophysics. In coordination with other multi-band and multi-messenger facilities, Mephisto will play an important role in discovering the unknown unknowns of the evolving universe. The successful development and operation of Mephisto will help enhance the global scientific and technique competitiveness of the Chinese astronomical community. It will also benefit significantly the growth of the next generation of young Chinese scientists.

Mephisto 研制期四年（2018-2021 年），预计 2022 年正式投入观测。目前，在各方大力支持下，项目按计划进行，进展顺利。

The development of Mephisto is expected to take four years (2018-2021). Thanks to the strong support and enthusiastic cooperation of all parties, the project is progressing as planned.

• 大事记 Chronicle of events

- 2015 年 10 月 刘晓为教授提出 Mephisto 概念
- 2017 年 09 月 云南大学中国西南天文研究所成立
- 2017 年 12 月 首届 Mephisto 科学研讨会召开
- 2018 年 01 月 项目专家论证会召开
- 2018 年 01 月 项目在云南大学立项
- 2018 年 10 月 与南京天文光学技术研究所签订望远镜研制合作协议
- 2019 年 04 月 首届“东陆天体物理论坛”召开
- 2019 年 10 月 与云南天文台签订台址相关协议
- 2019 年 11 月 完成 e2v CCD 芯片及三台 Andor 单芯片科学级超大靶面 CCD 先导相机采购合同签署
- 2020 年 5 月 望远镜主体工程开工
- 2020 年 9 月 Mephisto 数据中心开工

- In October 2015, Prof. Xiaowei Liu proposed the concept of Mephisto.
- In September 2017, South-Western Institute For Astronomy Research at Yunnan University (SWIFAR-YNU) was founded.
- In December 2017, the 1st Mephisto Workshop was held.
- In January 2018, the expert feasibility study meeting of Mephisto was held.
- In January 2018, the Mephisto project was formally approved by Yunnan University.
- In October 2018, cooperation agreement on telescope development was signed with the Nanjing Institute of Astronomical Optics & Technology, CAS.
- In April 2019, The 1st Donglu Astrophysics Forum was held.
- In October 2019, agreements on site construction and maintenance were signed with Yunnan Observatories, CAS.
- In November 2019, procurement contracts for both e2v CCD sensors and 3 Andor iKon-XXL cameras was signed.
- In May 2020, the constructions of the Mephisto telescope main building were launched.
- In September 2020, the constructions of the Mephisto data center were launched.

• 望远镜建设 Telescope Construction

南京天文技术光学研究所（天光所）负责望远镜主体研制工作，每月提交书面进展报告，召开月度双边例会，汇报研制进展和问题。整体进展顺利，因新冠肺炎疫情影响，部分研制进度受限，预计 2021 年初完成出厂验收，2021 年底望远镜完成进场安装调试，实现初光，并开展巡天试观测以及相关科学研究。

The Nanjing Institute of Astronomical Optics & Technology (NIAOT) is responsible for the telescope construction. To ensure the progress, the NIAOT project team submits a written progress report and holds bilateral workshops to present the recent development of the telescope optical system, mechanical structure, and electronic control system on a monthly basis. Good progress was made. While some delay happens due to the impacts of the Covid-19 pandemic, the project team will step up the effort. Currently, they aim to finish the telescope construction and complete the in-house acceptance review around the beginning of 2021. It is expected to complete the on-site telescope installation and commission, realize the first light, and carry out a pilot survey and scientific researches by the end of 2021.

✧ 主要进展 Main Progress:

- 主、副镜正在进行最后的抛光检测，改正镜和滤光片加工完成；小系统立方棱镜正在进行加工检测。
- 正在加工主镜室；副镜支撑五维调节机构装配完成，正在进行机电调试；机架大件焊接基本完成，准备装配。
- 望远镜控制系统调试完善中。

- The primary and secondary mirrors are in the final stage of polishing and testing. The optical fabrication of the lens correctors and filters has been completed. The cube prisms are being processed and tested.
- The primary mirror chamber is being processed; The assembly of the 5-dimensional regulating device for secondary mirror support is completed, and the mechanical and electrical commission is in progress. The welding of the whole frame structure is generally completed and ready for assembly.
- The telescope control system is being debugging and improved.

图 3.1：主镜 The primary mirror

图 3.2：左：副镜支撑五维调节机构；右：部分机架部件 Left: the 5-dimensional regulating device for secondary mirror support; right: some components of the whole frame structure

- 台址建设 Site Development

经前期深入调研、实地勘察、专家论证、台址监测，Mephisto 安装在云南天文台丽江天文观测站 5 号点，由云南天文台负责改造升级现有基础设施，以满足 Mephisto 项目要求。

After an in-depth investigation, on-the-spot survey, expert demonstration, and site monitoring, Mephisto is decided to be installed at Point No.5 of Lijiang Observatory, Yunnan Observatories, CAS. Yunnan Observatories are responsible for the site development to meet the requirements of the Mephisto project.

✧ 主要进展 Main Progress:

- 2020 年 2 月，台址建设进入工程阶段。
- 2020 年 3 月，完成林木采伐和主体工程地勘工作。
- 2020 年 4 月，云南省设计院完成 1.6 米多通道测光巡天望远镜主体工程施工图设计。
- 2020 年 5 月，主体工程正式开工。完成基墩−1.5 米以上基岩开凿和主风道钢筋混凝土施工。

- In February 2020, the site development has entered the construction phase.
- In March 2020, the work of tree cutting and geological drilling was completed, yielding good results.
- In April 2020, Yunnan Design Institute completed the construction drawing of the Mephisto main building.
- In May 2020, the Mephisto main building construction kicked off. The excavation of bedrock above −1.5m of the base pier and the concreting of the main ventilation tunnel was completed.

图 3.4：基岩开挖 Bedrock excavation

- 2020 年 6 月，主体工程基墩和建筑物基础（至地平−1.5 米）完成浇筑。

- In June 2020, concreting the telescope base pier trough and the foundation of the telescope main building (up to −1.5m of the ground level) were completed.

图 3.5：基墩和建筑物基础浇筑(1.5 米以下) Concreting the telescope base pier trough and the foundation of the telescope main building (up to -1.5m of the ground level)

- 2020 年 7 月-9 月，依次对主体工程基墩和建筑物进行分段浇筑。截至目前，已完成主体工程基墩第三段以及建筑物五层（至地平+12.8m）浇筑。主体工程正式封顶。
- 2020 年 9 月，“云南大学 1.6 米测光巡天望远镜丽江高美古址点站址环境监测系统及长期监测和评估项目”顺利验收。自 2019 年 1 月建成以来，整套自动天文望远镜站址环境长期监测系统运行情况良好，数据采集实现了自动化，各项技术指标达到要求，为云南大学 1.6 米测光巡天望远镜未来的巡天提供了详实的数据基础。
  根据云南大学与云南天文台 2019 年 10 月 16 日签署的《云南大学 1.6 米测光巡天望远镜运行维护技术服务合同》，该项目验收后由云南天文台 2.4 米望远镜运维小组负责系统的运行维护（包括故障维修）、数据采集和分析、推送监测数据日报等，并定期（每半年）向 1.6 米测光巡天望远镜项目组提供详尽标准的报告。

图 3.6：“云南大学 1.6 米测光巡天望远镜丽江高美古址点站址环境监测系统及长期监测和评估项目”验收会
Acceptance review meeting of the "Astronomical site monitor system, long-term monitoring and assessment project of Mephisto telescope at Lijiang Gaomeigu Observatory site"

- From July to September 2020, the telescope base pier trough and the foundation of the telescope main building are poured in proper sequence. Till now, the structural pouring and capping of the telescope main building were completed.
- In September 2020, the "Astronomical site monitor system, long-term monitoring and assessment project of Mephisto telescope at Lijiang Gaomeigu Observatory site" was successfully accepted by Yunnan University. Since its completion in January 2019, the whole set of automatic astronomical telescope site monitoring system has been operating well, data has been automatically collected, and all technical indicators have met the requirements, providing valuable data for the future operation of Mephisto.
  According to the "Technical Service Contract for the Operation and Maintenance of Mephisto" signed between Yunnan University and the Yunnan Observatory on October 16, 2019, after the acceptance of the project, the operation and maintenance team of YNAO 2.4m telescope will be responsible for the operation and maintenance of the system (including breakdown maintenance), data collection and analysis, pushing out daily monitoring data, etc., and provide detailed standard reports regularly (every six months) to the Mephisto project team.

图 3.7：主体工程封顶 the structural pouring and capping of the telescope main building were completed

图 3.8：自上而下：第二段基墩完成浇筑；建筑物五层完成浇筑；第三段基墩浇筑
From top to bottom: concreting the second section of the telescope base pier trough (completed); concreting the fifth floor of the telescope main building (completed); concreting the final section of the telescope base pier trough

图 3.9：目前主体工程外观图 Exterior view of the telescope main building

- 圆顶、数据中心及其他附属设施 Dome, Data Centre and Auxiliary Facilities

✧ 主要进展 Main Progress:

- 2019 年 12 月，完成 1.6 米多通道测光巡天望远镜穹顶采购合同签署。
- 2020 年 4 月，南京天文仪器有限公司完成 1.6 米多通道测光巡天望远镜穹顶设计方案，并通过专家评审。
- 目前，1.6 米多通道测光巡天望远镜穹顶已具备出厂条件。近期将在主体工程建筑物五层铺设穹顶预埋件。
- 风机房完成结构浇筑和封顶。
- 防雷塔完成吊装，防雷接地网初验合格。
- 2020 年 9 月，数据中心开工。

- In December 2019, the procurement contracts for the Mephisto dome were signed.
- In April 2020, CAS Nanjing Astronomical Instrument Co., Ltd. completed the dome design scheme of Mephisto. The design scheme has been reviewed and approved by domestic experts.
- Currently, the Mephisto dome is ready for delivery. The dome's embedded parts are scheduled to be laid on the 5th floor of the telescope main building soon.
- The structural pouring and capping of the ventilator were completed.
- The hoisting of the lightning protection tower was completed, and the lightning protection grounding grid passed the preliminary inspection.
- In September 2020, data center launched its construction.


图 3.10：左：防雷塔；右：数据中心基坑开挖
Left: lightning protection tower; right: foundation pit excavation of the data center


图 3.11：左：数据中心基础钢筋绑扎；右：数据中心完成基础浇筑
Left: foundation reinforcement binding of the data center; right: foundation pouring of the data center completed

• CCD 相机研制 CCD Camera Development

Mephisto 望远镜配备 3 台超大靶面相机，覆盖直径 250 毫米焦面。国际上单个 CCD 芯片的最大尺寸只有 90 毫米，须采用多个 CCD 芯片拼接技术以覆盖整个焦面，研制技术难度大，周期长，不论是拼接、制冷、还是电控，国内尚无成功经验。

Mephisto is equipped with three CCD cameras, covering a 250 mm diameter of the focal plane. The maximum size of a single CCD chip in the world is only ~ 90mm. Therefore, it is necessary to use chip splicing technology to cover the whole focal plane. The development of technology is difficult, and the production cycle is long. There is no successful experience in splicing, refrigeration, or electronic control in China.

✧ 主要进展 Main Progress:

- 2020 年 2 月 12 日，与国家天文台正式签署"云南大学 1.6 米多通道测光巡天望远镜（Mephisto）CCD 拼接相机预研制合作协议"，CCD 拼接相机预研制工作正式开始。
- 光本卓研科研有限公司和安道尔公司每月提交有关 e2v CCD 芯片以及 Andor iKon-XXL 科学级超大靶面 CCD 相机的书面进展报告。截至目前，情况良好，未出现明显延误。预计 2021 年上半年所有芯片和相机到货。

- In February 2020, South-Western Institute for Astronomy Research (SWIFAR), Yunnan University, and National Astronomical Observatories, CAS officially signed the "Pre-development cooperation agreement on mosaic CCD cameras for Mephisto of Yunnan University," and the pre-research and development of mosaic CCD cameras began officially.
- Photon Basic Research Technology Limited and Andor Technology Limited submit the monthly progress reports of the e2v CCD sensors' production status and the Andor iKon-XXL cameras, respectively. Hitherto, the projects are in good shape, and no significant delay is reported. All sensors and cameras are expected to arrive before June 2021.

• Mephisto 软件与科学 Mephisto Software and Science

项目成立 5 个工作组——科学、巡天策略、数据处理、时域以及观测控制系统 OCS 组，自 2019 年 1 月以来每两周举办一次项目讨论会或月度双边例会，讨论在科学预研、巡天策略及模拟、数据处理软件、变源暂现源搜寻与证认、观测控制系统 OCS 等方面的进展与问题，正在对核心科学目标进行定量分析，开发相关巡天模拟软件、针对变源的快速图像预处理软件以及高精度数据处理软件。

Five working groups on science, survey strategy, data processing, time-domain astronomy, and observatory control system were set up for the project. Since January 2019, the biweekly series of Mephisto Software and Science Meetings are held, and the respective progress of each group is introduced. Quantitative analysis of the key scientific objectives is being carried out. The relevant software on survey strategy, image pre-processing for variables and transients, and high-precision data processing are being developed.

- “五十公分测光望远镜阵列”建设 Construction of “50 cm Telescope Array”

“五十公分测光望远镜阵列”由 3 台 50 公分望远镜组成，原计划安装在中国科学院国家天文台阿里天文站，是 Mephisto 的先导项目，将为 Mephisto 研制、数据采集和处理、分析和定标等积累宝贵经验。

“50 cm Telescope Array” comprises three 50 cm telescopes, originally planned to be installed at Ali astronomical station of the National Astronomical Observatory, CAS. It is a pilot project of Mephisto, which will accumulate valuable experience for the development, data acquisition and processing, analysis and calibration of Mephisto.

✧ **主要进展 Main Progress:**

- 完成望远镜采购、阿里天文台云大观测点选址及基础建设工作。
- 2019 年底完成一台 50 公分望远镜在阿里天文台云大观测点的安装和初步调试。
- 受限于阿里天文台的电力供应和后勤条件，将“五十公分测光望远镜阵列”搬迁至云南天文台丽江天文观测站。目前 50 公分望远镜阵列主体基建（搬迁）已开工，预计 2020 年下半年投入使用。

- The telescope procurement, site selection, and infrastructure construction have been completed.
- The installation and preliminary commissioning of the first 50 cm telescope have been completed at Ali astronomical station around the end of 2019.
- Limited by the power supply and logistics conditions of Ali astronomical station, the "50 cm Telescope Array" is relocated to Lijiang Observatory, Yunnan Observatories, CAS. Currently, the construction (relocation) of the “50 cm telescope array" has been kicked off and is expected to be put into use in the second half of 2020.

四、教学和研究生培养 Teaching & Graduate Training

教学 Teaching & Learning

培养高质量国际化人才是研究所的使命和目标。为此，自成立以来，研究所致力于营造浓厚的学术氛围，通过每周一次的学术报告、午餐报告、文献阅读、团组讨论会等，为研究生了解学科前沿、不断提升自身能力提供高水平平台。研究所举办多次国际国内学术会议，邀请国内外著名学者来访，拓展学生视野，提高其学术交流能力。与此同时，从选拔学生到选择导师到各个培养环节，研究所建立了系统的研究生培养方案。经过短短 3 年，已建成一支充满活力和科研热情的研究生队伍，目前有硕士生 24 名，博士生 6 名。

High standard student training constitutes a crucial part of the mission of SWIFAR as a research institute. Since its establishment in Sept. 2017, the Institute has made great efforts to provide our students with a stimulating academic environment. Through weekly colloquia, lunch talks, journal club talks, and group meetings, the students are exposed to frontier researches, and their capability of knowledge understanding has improved significantly. By hosting different international and national conferences and inviting renowned scientists worldwide to visit us, SWIFAR has engaged the students in direct communications with front-line researchers, which has not only broadened the students' vision of scientific research but also led them to be known by the community largely. We have also set up a detailed training plan for our students. After only three years, we now have a very active team of graduate students, 24 MSc students, and 6 Ph.D. students, who are lively and enthusiastic about scientific research.

图 4.1: 2020 级硕士研究生见面会 Meeting with postgraduate students of Grade 2020

最早进入研究所的 6 名 2017 级硕士研究生中，其中 4 名已转为研究所博士生。另外 2 名于 2020 年 6 月顺利毕业，获得硕士学位，何紫朝同学的硕士论文获得物理与天文学院优秀论文奖，已被中国科学院国家天文台录取为博士生，邓文强同学被中山大学录取为博士生。6 名学生已有多项研究工作在国际主流学术期刊发表。

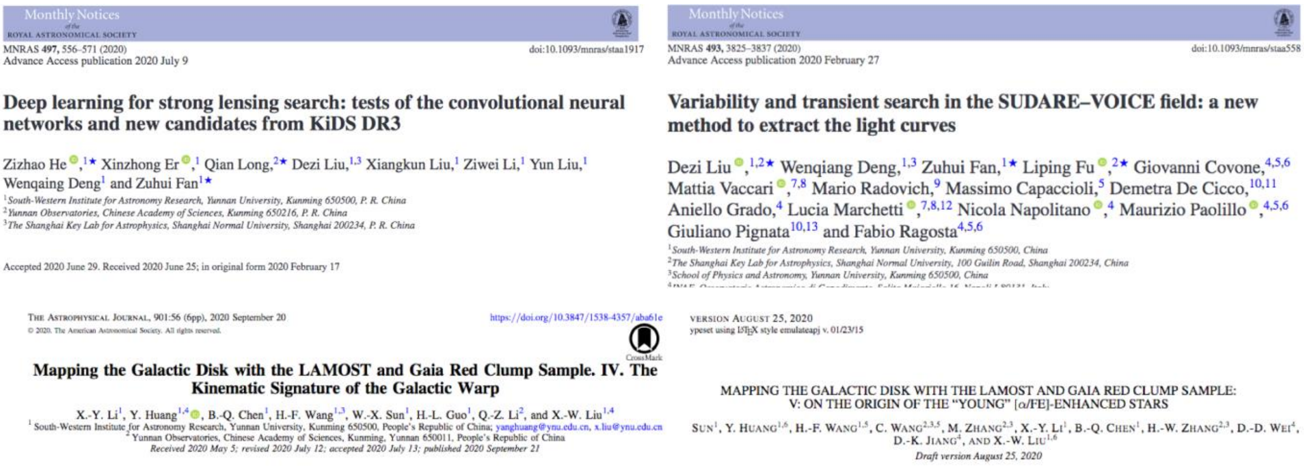
For the first six students joining SWIFAR in 2017, four of them have transferred to the SWIFAR Ph.D. program, and the other two graduated with a Master's degree in June 2020. Among the two, Zizhao He received the excellent MSc thesis award from the School of Physics and Astronomy, YNU. He is now a Ph.D. student of NAOC, CAS. Wenqiang Deng has been admitted to a Ph.D. program in Sun Yat-sen University. There are quite a number of publications already from the six students.

图 4.2: 何紫朝同学被评为 2020 年度物理与天文学院优秀毕业生 Mr. Zizhao He has been awarded the outstanding graduate of the School of Physics and Astronomy.

图 4.3: 在邓文强和何紫朝同学获得硕士学位后，SWIFAR 宇宙学小组的合照 Photo of the SWIFAR cosmology group after graduation of Mr. Zizhao He and Mr. Wenqaing Deng

本着以人为本、授之以渔的宗旨，研究所对研究生高标准严要求，学生素质和科研能力快速提升，得到国内各科研院校的广泛认可。但相比于其他一流高校，差距仍在。路漫漫其修远，吾需继续前行，为打造中国西南天文人才培养重镇不懈努力。

Aiming to foster excellent young scientists, SWIFAR has established a culture of high standard and self-driven for student training. The quality of our students has been improving fast, well recognized by the community. On the other hand, we still have a long way to go to fulfill our mission of making SWIFAR an incubator of next-generation talents.



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Deep learning for strong lensing search: tests of the convolutional neural networks and new candidates from KiDS DR3

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Variability and transient search in the SUDARE–VOICE field: a new method to extract the light curves

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Mapping the Galactic Disk with the LAMOST and Gaia Red Clump Sample. IV. The Kinematic Signature of the Galactic Warp

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MAPPING THE GALACTIC DISK WITH THE LAMOST AND GAIA RED CLUMP SAMPLE: V: ON THE ORIGIN OF THE "YOUNG" [α/FE]-ENHANCED STARS

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图 4.4: 由研究所四位同学（何紫朝、邓文强、李新意和孙伟祥）为第一作者分别发表或被接受的论文 Some representative papers related to four Master students of SWIFAR, i.e., Mr. Zizhao He, Mr. Wenqiang Deng, Mr. Xinyi Li, and Mr. Weixiang Sun

✧ 2020级硕士生陈鑫磊谈在中国西南天文研究所学习感悟：

就我个人而言，我感到非常荣幸可以加入中国西南天文研究所这个大家庭。研究所浓厚的学术氛围，驱使我不断汲取知识，提升个人素质。诸如午餐讨论会和学术报告等各类学术活动，让我有机会可以参与到国内外优秀天文学者的讨论中，这令我每天的学习生活都过得十分紧凑、充实。此外，SWIFAR人性化的研究生培养方案，使我们有近一学年的时间，可以通过参加不同的组会来了解天文学领域的各个研究方向和前沿内容，同时积累物理学和天文学方面的基础知识，进而选择自己感兴趣的研究方向。

SWIFAR成立短短三年，但其安静的学习环境，认真负责的老师们以及国际化的学术视野，为学生进一步发展提供了完善的条件。我希望自己可以充分利用这些资源，与其他人在不同领域进行充分的交流及学习，并且努力培养自己严谨科学的思维能力。同时也希望自己可以为SWIFAR的进一步发展添砖加瓦。在不久的将来，期待SWIFAR成为国际一流的学术平台。

✧ Xinlei Chen, M.Sc student of grade 2020, talks about his learning experience at SWIFAR:

图4.5：陈鑫磊同学在云南大学天文楼前

Mr. Xinlei Chen stands in front of the YNU Astronomy Building

For me, I was very lucky and honoured to have joined the big family of SWIFAR. SWIFAR is surrounded by an intense academic atmosphere, which motivates me to accumulate knowledge and improve personal qualities. Academic activities, such as Lunch Talks and Colloquia, offer me opportunities to participate in the discussions of outstanding astronomers at home and abroad. As a result, I have a busy and fruitful academic life. In addition, SWIFAR's humanized postgraduates' training scheme gives us nearly an academic year to choose our interesting research direction, by attending different group meetings to learn various research directions and advanced information in the field of astronomy and accumulating physics and astronomy knowledge.

Although SWIFAR was founded only three years, it provides students with a peaceful learning environment, responsible faculties and international academic perspectives， creating perfect condition for students' further development. Through making the most of these resources, I hope effective communication can be made with others and will try my best to cultivate the ability to think scientifically. Besides, I expect to contribute to the further development of SWIFAR. In the near future, I look forward to SWIFAR becoming an international first-class academic platform.

✧ 2020 级硕士生石瑞峰谈在中国西南天文研究所学习感悟：

我本科期间就读于云南大学天文系。研究所在云南大学成立后，举办了很多学术会议，会议邀请了天文学中众多领域的专家学者来给我们作报告。我当时对这些会议涉及到的领域就很感兴趣，在与上课时间不冲突的情况下就会跑去听研究所的报告，增长了见识的同时也学到了很多知识。印象最深的是研究所的午餐讨论会，这是每周一中午定期举行的，而中午我们是没有课程安排的，所以那个时候经常和同学相约来研究所参加午餐讨论会，当时就感觉到研究所的学术氛围十分浓郁。

当我以研一新生的身份正式加入研究所后，我对研究所的认识更加全面、完整了。这是一个要打造成为同国际接轨的研究所，有多种学术活动，除了午餐讨论会还有学术会议、科普报告等等。在午餐讨论会与学术会议中演讲者都是用英文对自己的主题进行阐释，这就为我们提供了锻炼英语的机会， 我相信在这种环境下接受长期培养， 我们的英语水平会有大的提高。除此之外，我还参加了组会，通过组会我可以更好地了解关于银河系和高能天体物理的一些基本知识与研究方法。我以前不常用邮件，而研究所有各种会议需要我们参加，会有老师通过邮件告知我们会议的时间和地点，因此在这短短 1 个月的时间里我已养成定期查看邮件的习惯。

图 4.6：石瑞峰同学在云南大学天文楼前

Mr. Ruifeng Shi stands in front of the YNU Astronomy Building

亮堂的办公室， 宽大的办公桌，融洽的学习与工作氛围，大家彼此之间经常沟通、解决在科研中遇到的问题。同老师交谈，能够感受到老师扎实的学术功底，而具备这样的功底也是我该努力的方向。

在研究所的学习与工作节奏是比较快的，研究所对我们的要求也是比较高的。我希望通过在研究所的学习与工作， 自身实力能够得到较大的提升， 进而能够对天文学领域作出一点贡献。

✧ Ruifeng Shi, M.Sc student of grade 2020, talks about his learning experience at SWIFAR:

I studied in the Department of Astronomy, Yunnan University during my undergraduate period. After SWIFAR established, a lot of academic conferences has been held. Many experts and scholars in different areas of astronomy are invited to give lectures to us in such conferences. At that moment, I was very interested in the areas they mentioned in the conferences, so I came to listen to reports if the time for colloquiums hadn't conflicted with the time for courses. By joining those presentations, I not only broadened my horizon but acknowledged a lot of knowledge. The most impressive thing of SWIFAR for me is the lunch talk which was held on every Monday at noon. Since there were no courses at noon, I often attended lunch talk with my classmates. At that moment, my impression was that SWIFAR's academic atmosphere was great.

When I joined SWIFAR as a postgraduate freshman, my understanding of SWIFAR became more comprehensive and complete. The goal of SWIFAR is to build into an institute which is geared to international standards. There are lots of academic activities in SWIFAR, including Lunch Talks, Colloquia, lectures about popular science, and so on. Both in lunch talk and colloquium, the speakers use English to explain his/her subject. This provides a good chance for us to practice English listening and speaking. I hold the belief that our abilities of English listening and speaking will be strengthened through long-term cultivations in such an environment. Besides, I also attend two group meetings: one is the Milky Way group meeting, another is the high-energy astrophysics group meeting. I not only acknowledge basic knowledge but acquire some research methods of the Milky Way and high-energy astrophysics by attending group meetings. Before I joined in SWIFAR, the frequency that I checked my email was low. However, I develop the habit of checking my email regularly in just one month. The reason is that we should attend many kinds of meetings in SWIFAR and we ought to check emails sent by teachers to know when and where to attend meetings.

SWIFAR offers us bright offices where wide desks are assigned. The atmosphere of studying and doing research is harmonious. It is quite common to see that researchers communicate with each other to solve problems that they met in doing researches. When talking with teachers, I can strongly realize that our teachers acknowledge deep academic knowledge. To reach such level is also the goal that I should try my best to achieve.

The learning and working rhythm at SWIFAR is quick, and its requirements for us are high. I hope that my strength can be significantly improved through learning and working at SWIFAR. Then I will be able to make contributions to the field of astronomy.

博士后感言 Postdoc’s Message

✧ 云南大学中国西南天文研究所博士后刘德子感言：

2017 年夏，SWIFAR 成立之初，我恰逢博士毕业，并有幸成为其中的第一个博士后。3 年的时间里，SWIFAR 师生从几间临时办公室搬到如今的天文楼，办公条件和设备不断地改善，人员也不断扩增，科研影响逐年提升。其间，师生们为各项事务繁忙的奔波仍然历历在目。伴随着 SWIFAR 的成长，自己也收获颇多。

SWIFAR 提供的办公条件和科研环境使得我能够更加潜心于自己的研究，并可以随时和周围的老师同学讨论遇到的困难。SWIFAR 也会定期举办各类学术报告会，这让我获得了许多与其他机构来访的研究人员相互交流讨论的机会。目前，我正参与到 Mephisto 1.6 米望远镜的暂现源研究项目中。从最初对这个领域的一片空白，到如今项目的每一次深入进展，我不仅体会到建设一个望远镜的不易，也学习到很多的知识和技能，拓展了自己的研究领域。

昆明气候宜人，校园环境也十分优雅。但这里不仅有宜人的环境，更有师生之间真诚的关心帮助。来到 SWIFAR 从事博士后研究，既是一种幸运，也是一种激励。最后，衷心祝福 SWIFAR 百尺竿头，更进一步！

✧ Message from Dezi Liu, postdoctoral fellow of SWIFAR, YNU:

In the summer of 2017, I completed my PhD and luckily joined SWIFAR, which was just founded at that time, to continue my research as its first postdoctoral fellow. In the past three years, we moved from several temporary offices to the newly established astronomy building. The working conditions and equipment of SWIFAR got much ameliorated, more and more faculties and students were recruited, and the impact of scientific research also remarkably improved. All the endeavors that the faculties and students devoted to making SWIFAR better are still kept in my memory. During this period, I also learned a lot along with the development of SWIFAR.

图 4.7: 刘德子博士后 2017 年冬季参加引力透镜会议时拍摄的滇池 Photo taken at the Dianchi Lake when Postdoctoral Fellow Dezi Liu attended the Gravitational Lensing Workshop

The convenience provided by SWIFAR makes my research more efficient. I can discuss questions at any time with other people in the institute. The regular academic activities also give me many opportunities to communicate with researchers from other institutes. Currently, I am studying the transient objects for the near future Mephisto telescope. As a novice in this field, I am spending a lot of time learning new knowledge and developing the project. Every progress makes me excited. Furthermore, I deeply realized that it is most challenging to construct a new scientific telescope.

Kunming has a pleasant climate, and the campus also has an elegant environment. Besides, I receive lots of sincere care and help from the faculties and students at SWIFAR. It is both a blessing and an incentive to come to SWIFAR for post-doctoral researches. Finally, I sincerely wish SWIFAR to achieve more success!

✧ 云南大学中国西南天文研究所博士后王海峰感言：

惊风飘白日，光景西驰流，眨眼之间我来云南大学 SWIFAR 已逾二年。2018 年初来乍到之时，就已被“太华巍巍，拔海千寻，滇池淼淼，万山为襟”的云大历史与意境所吸引。

在 SWIFAR 期间，得益于其良好的学术土壤与环境，我的研究深度与广度得到了明显提升，发表系列文章的同时提出了一个可为之长期奋斗的银河起源探索计划（MWDPSG）；并在时域天文与天文大数据处理方面有了较深的认识与积累，部分国内国际合作文章也已见刊；研究课题陆续得到中国博士后科学基金面上资助和特别资助、国家自然科学基金青年项目、LAMOST 重大成果培育项目的支持。

春城昆明地处祖国西南边陲，气候温和，春色撩人，红情绿意。滇池河畔，引人入胜，我偶尔会利用工作之余在周边漫步。云大校园，绿树成荫，植被多样，亦是我时常踏青之地。这些闲暇时光都间接促进了我对科学的思考与热爱。

恰逢 SWIFAR 成立三周年之际，我情不自已地想用寥寥数语表达对这片沃土的感激与祝福。衷心感谢刘晓为教授、范祖辉教授、黄样副教授、陈丙秋副教授等前辈学者和同事对我天文事业与理想的促进。未来我会在脚下的土地上，继续不忘初心，砥砺奋进。最后，真诚祝愿 SWIFAR 在新的三年迈向更加璀璨的美好明天。

✧ Message from Haifeng Wang, postdoctoral fellow of SWIFAR, YNU:

The wind is blowing in the sun, and the scenery is flowing west. Time goes so fast, and I have been working at SWIFAR-YNU for more than two years. “Lofty Taihua Mountain rises thousands of meters above the sea; ten thousand mountains skirt vast Dianchi Lake”, -- When I first came to Yunnan University two years ago, I began to be attracted by its history and artistic conception.

During my years at SWIFAR, thanks to the very nice academic environment as well as the rich soil of our institute, the depth and scope of my research have significantly improved, and I have published a series of papers and proposed an ambitious plan called “MWDPSG” which strives for a global and unifying picture of the origins of the Milky Way disk. With some collaborating paper published, my other research fields such as time-domain astronomy and big data reduction have also, to some extent, acquired better understanding and accumulation. Fortunately, my researches are consecutively supported by the China Postdoctoral Science General and Special Foundation, Youth Program of National Natural Science Foundation of China and the Cultivation Project for LAMOST Scientific Payoff and Research Achievement of CAMS-CAS.

图 4.8: 王海峰博士后参加的中法实测天文学校留影（上图），其间的丽江高美古之行令人流连忘返（下图）

The Sino-French Observational Astronomy Summer School was held successfully at Yunnan University. During that period, Postdoctoral Fellow Haifeng Wang visited the Lijiang Gaomeigu Observatory. It was a memorable trip to him

The spring city of Kunming is located in the southwest of China. The climate is mild, and spring is in the air. Dianchi Lake is a fascinating place where I often take a walk during my free time. With its shady trees and diverse vegetation, the campus of

Yunnan University is also a choice for me to go outing. These leisure moments have indirectly contributed to my thinking and love for science.

On the occasion of the third anniversary of SWIFAR, I cannot help but express my gratitude and blessings to this fertile land in a few words. I want to express my heartfelt thanks to Prof. Xiaowei Liu, Prof. Zuhui Fan, Associate Prof. Yang Huang, Associate Prof. Bingqiu Chen, and other senior scholars and colleagues for their contributions to my astronomy career and dreams. In the future, I will continue to work hard on the land under my feet and never forget my original intention. Lastly, I wish SWIFAR a brighter and better future in the next three years.

图 4.9: 王海峰博士后周末漫步于昆明校园与郊区拍摄的照片

Photos taken by Postdoctoral Fellow Haifeng Wang while taking a walk in the Kunming city

五、 教师风采 Faculty Profile

陈丙秋，1986 年出生于湖南省道县，现为研究所副教授，主要研究领域为银河系三维消光、尘埃、星际介质、银河系结构、脉动变星、测光/光谱巡天。

Born in Dao County, Hunan in 1986, Bingqiu Chen is an associate professor of SWIFAR. His main research field is three-dimensional extinction maps, dust, ISM, structure of the Milky Way, pulsators (like RR lyrae stars), photometric/spectroscopic surveys.

钱德拉·巴哈杜尔·辛格，1982 年出生于尼泊尔的萨拉希，现为研究所助理教授，主要研究领域为利用半解析和数值的方法回答物质如何回落进黑洞并产生宇宙中能量最高的外流（高能天体物理、黑洞吸积和抛射现象、相对论流体动力学）。

Born in Sarlahi, Nepal in 1982, Chandra Bahadur Singh is an assistant professor of SWIFAR. His main research field is High Energy Astrophysics, Black Hole Accretion-Ejection Phenomena, and Relativistic Fluid Dynamics.

请两位老师简单介绍一下自己。

陈丙秋： 我出生在湖南省道县。2004 年考入北京师范大学学习天文学，2008 年本科毕业在北师大读研，2013 年拿到天体物理博士学位。后来在北京大学做了四年博后，2017 年来到云大工作。我博士期间的研究课题是脉动变星的周期分析以及银河系核球的消光分布，在北大参与了 LAMOST 反银心方向光谱巡天，跟着做了很多年，利用 LAMOST 数据做了一些银河系结构以及大仙女座星系的球状星团等工作，现在的主要研究领域为银河系三维消光、尘埃、星际介质、银河系结构、脉动变星和测光/光谱巡天等。

钱德拉： 我在尼泊尔出生和长大。呈贡是我生活过的第 14 个地方。在我出国读博之前已经在尼泊尔的 10 个地方生活过。在从特里布文大学完成了物理学专业的学士和硕士学位后，我又在印度加尔各答完成了我的博士学位。我的博士后工作则是在巴西圣保罗和以色列特拉维夫完成的。能在不同的国家和地区认识不同的人，实在是一段美妙的经历。

Could you briefly introduce yourself?

Bingqiu: I was born in Dao County, Hunan Province. I entered Beijing Normal University in 2004 to study astronomy and graduated in 2008 for my undergraduate degree. I got my PhD in astrophysics in 2013. Then I did four years of post-doctoral work at Peking University and came to work at Yunnan University in 2017. During my PhD, my research was on the period analysis of pulsators and the dust extinction distribution toward the Galactic Bulge. I then engaged in the LAMOST Spectroscopic Survey of the Galactic anti-centre at Peking University. Based on the LAMOST data, I did some studies on the structure of the Milky Way and the globular clusters in M31, etc. My main research interests now are the three-dimensional extinction maps, dust, ISM, structure of the Milky Way, pulsators (like RR lyrae stars), and photometric/spectroscopic surveys.

Chandra: I was born and raised in Nepal. Chenggong is my 14th place of residence. During my years in school and university, I lived in 10 different places in Nepal. I completed Bachelor's and Master's degree in Science with a specialization in Physics from Tribhuvan University. Then I moved to Kolkata, India, to complete my PhD. My post-doctoral works were done in Sao Paulo, Brazil, and Tel Aviv, Israel. It has indeed been a wonderful experience to know people in different places and countries.

两位老师会如何向一个孩子介绍自己目前的研究领域？

陈丙秋： 我们在天上看到那么多一闪一闪的星星，他们看起来很小，其实他们都跟我们的太阳一样，都是一个个发光发热的大火球。这些星星为什么看起来这么小呢？因为他们距离我们非常非常远。离我们最近的星星叫比邻星，如果我们要坐飞机去的话，得花 500 万年才能到达。大部分星星和星星之间都离得非常远，那么这些星星之间的地方，我们叫星际空间，是不是什么都没有呢？当然不是，在恒星与恒星之间这广袤的空间中并不是空无一物的真空，而是存在一些微小的固体颗粒，我们称之为星际尘埃。这些星际尘埃是怎么来的呢？目前，科学家们认为它们正是来自这些一闪一闪的星星。这些恒星是一个大熔炉，里面能产生各种元素。然后通过星风或者爆炸释放到星际空间，最终才形成了星际尘埃。

图 5.1：超新星遗迹 S147 Supernova remnant S147

钱德拉： 正如我们人类的出生和死亡，大恒星也会在一定时候死去。大恒星的死意味着它不再发光。光可以让恒星保持我们所看到的形状，但当它黯淡下去时，恒星就步入了死亡。恒星在这个过程中体积越缩越小，最后发生巨大的爆炸，剩下的就叫黑洞。我们之所以叫他黑洞，是因为它不仅是黑色的，没有光从它身上发出，而且也像一个洞，任何靠近它的东西都会掉进里面。我的工作是了解黑洞的特性：它们有多重？旋转速度有多快？要解答这些问题并不是一蹴而就的。黑洞善于从周围环境中摄取养料，比如从其他恒星身上获取。当它们从其他恒星和周围环境中获得物质时，这些物质会形成一种我们称之为“圆盘”的结构。根据这些物质所构成的形态，便可以推断出某个黑洞的重量。一个黑洞至少比我们的太阳重 3 倍，而太阳大约比我们整个地球重几十万倍。所以，哪怕是最小的黑洞也比地球重至少一百万倍。可它体积的半径却可能只有 3 公里，也就是沿着我们的居民小区走一圈，或是你从家走到学校的距离。有的黑洞重量是我们地球的一百万倍（1 后面跟着 12 个零），有的甚至是十亿万倍（1 后面跟着 15 个零）！我们可以把黑洞想象成厨房里的水槽。当我们洗锅的时候，泡沫和油污会流入下水管并流走，而当它们流速过快时，有些脏东西和水就会飞溅起来；同样地，落入黑洞的物质也会以比较高的速度被弹射和抛出，我们称之为 "喷射"。黑洞周围温度非常高（是开水温度的几百万到十亿倍），其速度则是非常、非常高（比高速赛车快一万倍）。我的工作就是利用计算机和一些数学模型研究那些落入黑洞和被从黑洞中抛出的物质的特性。

图 5.2: 钱德拉 • 巴哈杜尔 • 辛格助理教授在加德满都为大学师生作讲座
Assistant Professor Chandra Bahadur Singh giving talks for University students and faculties in Kathmandu

How would you explain your field of research to a child?

Bingqiu: We see so many twinkling stars in the sky. They look so small, but they are all just like our Sun; they are all big balls of fire. Why do these stars look so small? Because they're very, very far away from us. The nearest star to us is Alpha Centauri. But it would take us five million years if we were to take a plane to get there. Most of the stars are very far away from each other, so are these places between them, which we call interstellar space. You might think there is nothing in the interstellar space--You're wrong! The vast space between stars is not a vacuum of nothing. There exist some tiny solid particles of what we call interstellar dust. Where does this interstellar dust come from? Scientists now believe that they come from these twinkling stars. The stars are a melting pot that produces various elements. They are then released into interstellar space by a stellar wind or explosion, which eventually creates interstellar dust.

Chandra: Just as we humans born and die, big stars also die at some point in the same way. When they die, it means they are no more able to give light. The light can hold the stars in shape as we see them. But when it gets turned off, they are dead. The stars shrink in size during the process and end up with a huge explosion, and what remains is called a black hole. It is black as no light comes from it and like a hole as anything close to it falls onto it. My work is to understand their properties: how heavy they are and how fast they spin. There are only indirect ways to do it. Black holes are good at feeding on supply from surroundings like from other stars. When they pull matter from other stars and surroundings, the matter forms a structure that we call “disc.” Based on how that matter behaves, we can say how heavy a black hole is sitting there. A black hole should be at least three times heavier than our Sun. Our Sun is around several hundred thousand times heavier than our whole Earth. So, even the smallest black holes formed are at least 1 million times heavier than Earth but contained in a small volume with a radius of 3 kilometres like our small colony of houses, or the distance from your home to school. There are black holes like 1 million million (1 followed 12 zeros) times heavier than our Earth and several which are even 1 thousand million million (1 followed by 15 zeros) times heavier than Earth. The activity of a black hole can be imagined as that of a water sink in our kitchen, where things enter and disappear when we clean our cooking pots—sometimes water and waste jump when things try to pass through the sinkhole with high speed; in the same way, matter falling onto the black hole is also ejected and thrown away with relatively high speed, which we call “jet.” The surrounding of the black hole has a very high temperature (several million to billion times hotter than boiling water) and very, very high speed (10000 times faster than a high-speed racing car). My work is to study the properties of those matters falling into and thrown away from the black holes using computers and some mathematical techniques.

两位老师目前有哪些短期和长期的学术科研目标？

陈丙秋： 短期的目标是把我的青年基金项目完成，对大仙女座星系的运动学和化学性质做一些细致的分析。长期的话，希望能在银河系以及大仙女座星系结构和尘埃分布上做一些工作。

钱德拉： 眼下，我正打算成立一个研究小组，让尽可能多的学生参与进来；我还计划申请中国的国家科研基金，以便获得足够的经费；在科研成果方面，我期待着能够发表一些高质量的学术文章。至于长期目标，我希望能够助力 SWIFAR 成为一个国内外高能天体物理学家纷纷慕名而来，并在一些重点项目上积极开展合作的研究所。

What are your short-term and long-term research and scholarship goals?

Bingqiu: In the short term, my goal is to finish my Young Scientists Fund and do some detailed analysis of the kinematics and chemical properties of the Andromeda galaxy. In the long term, I hope to do some works on the structure and dust distribution of the Milky Way and the Andromeda galaxy.

Chandra: For the moment, I plan to start my research group and involve as many students as possible. I also plan to get some national grants to have sufficient funding. In terms of research output, it will be good to be able to publish some nice works. For long-term goals, I will like to see SWIFAR as an institute where high energy astrophysicists from within China and abroad will like to visit and collaborate with us and work on some key projects.

（@钱德拉）您为何选择到中国任教？为何选择了 SWIFAR？

钱德拉： 2019 年，当我还在以色列特拉维夫大学做博士后的时候，就开始在世界范围内寻求一份高校教职的工作。中国在这一点上十分有吸引力，因为政府在基础研究方面的投资相当鼓舞人心。所以当我成功申请成为了 SWIFAR 的一员时，我意识到这将是我在科研工作上取得长足进步的契机。就我个人而言，从 SWIFAR 所在的城市坐飞机回家乡只需要三四个小时。这样看来我工作的城市离故乡尼泊尔其实也不过咫尺之遥。

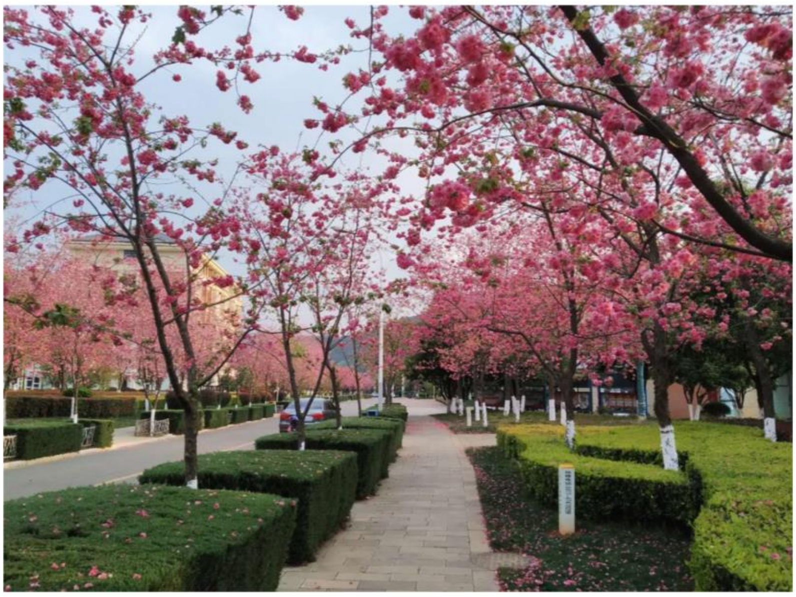


图 5.3: 钱德拉·巴哈杜尔·辛格助理教授在去云南大学食堂的路上拍摄的照片 Photo taken by Assistant Professor Chandra Bahadur Singh on his way to the University canteen

(@ Chandra) What was your motivation to come to China? Why did you choose SWIFAR?

Chandra: During my post-doc years at Tel Aviv University, Israel, in 2019, I started looking for opportunities to work as a faculty. China has been attractive in that case because of investment in basic research is quite encouraging. So when I applied and got the offer from SWIFAR, I realised it was an excellent opportunity for me to grow in scientific works. On a personal level, SWIFAR is located in such a place, which is just 3-4 hours flying distance from my native place. I am located just next to my own country, Nepal.

加入 SWIFAR 以来，两位老师的学术研究有了哪些进展？

陈丙秋： 加入 SWIFAR 以后，我在银盘的尘埃分布、银河系旋臂的结构、银河系中分子云以及超新星遗迹距离测定和大仙女座星系特殊天体的证认与参数测定等方向的研究获得了一些科研成果。

钱德拉： 成为 SWIFAR 的一员后，我享有完全的自由，可以在继续科研工作的同时合理支配业余时间。我手头有几项工作已进入收尾阶段；两篇与美国合作者共同完成的论文已在审稿过程中，即将发表；3 篇与来自巴西、日本、印度和以色列的合作者一起撰写的论文也将很快提交审稿程序。同时，我也在积极寻求同物理与天文学院夏莼和其他外国专家达成合作的可能性。就在几个月前，我们向国家自然科学基金委员会提交了面上项目的申请，并期待着它能够得到批准。与我合作的两名博士生（一个来自荷兰，一个来自以色列）也已在我的协助下完成了他们的研究项目，并发表了两篇论文。

Have you made any progress in your research ever since you joined SWIFAR?

Bingqiu: Since joining SWIFAR, I have obtained some scientific research achievements on dust distribution of the Galactic disk, the Galactic spiral structure, distances to molecular clouds and supernova remnants in the Milky Way, and identification and parameter determination of M31 sources.

图 5.4：大仙女座星系 M31 Andromeda galaxy M31

Chandra: Since joining SWIFAR, I have enjoyed complete freedom to continue my scientific works and manage my time. Several works are being concluded. Two papers are already under review processes and have been done along with a collaborator from the US. Three papers are being written along with collaborators from Brazil, Japan, India, and Israel. Those will soon be submitted for the review process. Some possibilities of new collaborations with Chun Xia from the department of astronomy, YNU, and faculties abroad have also been explored. Some months ago, a general program proposal was submitted to the National Science Foundation of China. We are hopeful it will get approved. Two Ph.D. students (one from the Netherlands, another from Israel) working in collaboration with me have completed their works, and two papers got published.

在 SWIFAR 成立三周年之际，（@陈丙秋）请谈谈您陪伴研究所一路走来的感想和对它未来发展的展望；（@钱德拉）您想用尼泊尔语对 SWIFAR 的师生说些什么呢？

陈丙秋： 研究所自成立以来，老师和同学们通过艰苦创业，奋发拼搏，为研究所的发展贡献自己的力量。我认为在未来的发展中，研究所会越办越好。

钱德拉：	एकता शक्ति हो। SWIFAR को भविष्य र हाम्रो भविष्य एक हो। सँगै काम गरौं र हाम्रो सुनौलो भविष्यको लागि कामना गरौं।

（团结就是力量。我们和 SWIFAR 拥有同一个未来。让我们为这个金色的未来怀抱希望、共同努力。）

On the occasion of the 3rd anniversary of SWIFAR, (@ Bingqiu) could you tell us about your journey with the Institute and your vision for its future? (@ Chandra) What do you want to say to the faculty, staff, and students of SWIFAR in Nepali?

Bingqiu: Since the establishment of SWIFAR, the faculty and students have contributed to the Institute's development through hard work and dedication. I believe SWIFAR will grow better and better in the future.

Chandra: एकता शक्ति हो। SWIFAR को भविष्य र हाम्रो भविष्य एक हो। सँगै काम गरौं र हाम्रो सुनौलो भविष्यको लागि कामना गरौं।

(Unity is strength. The future of SWIFAR and our future is one and the same. Let’s work together and wish for our golden future.)

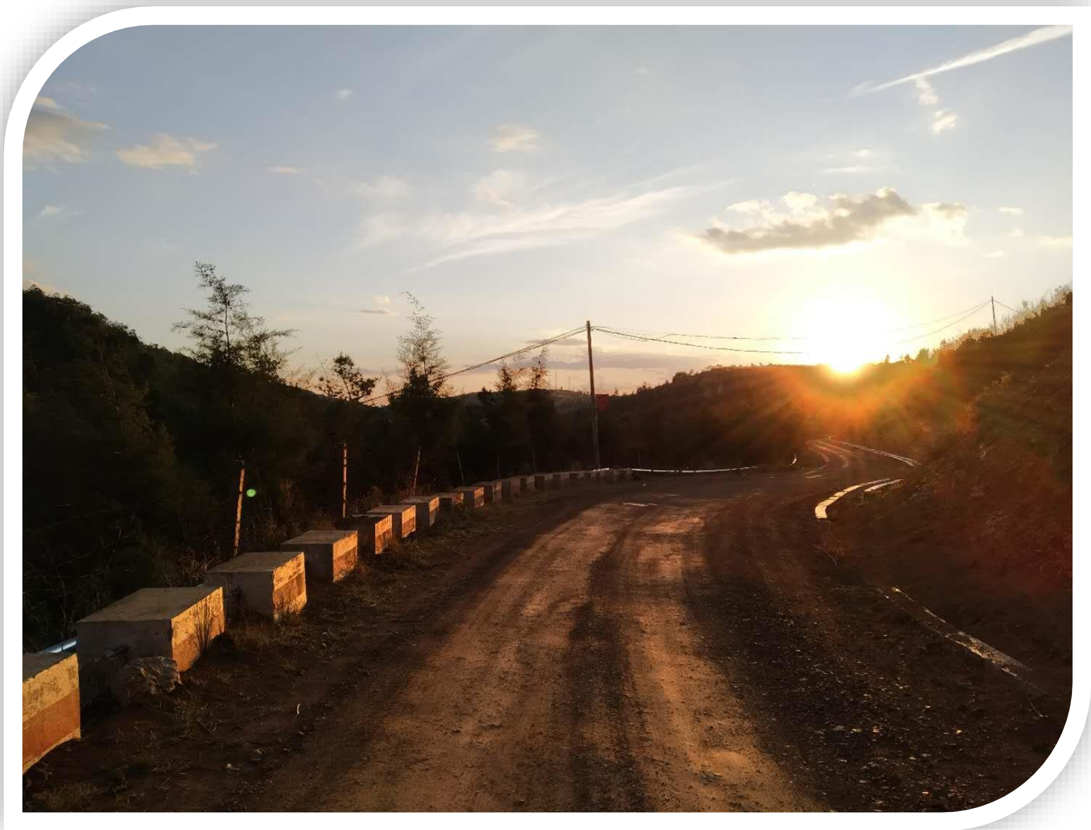


图 5.5：钱德拉・巴哈杜尔・辛格助理教授在昆明市呈贡区周边小山上骑车时拍摄的照片
Photo taken by Assistant Professor Chandra Bahadur Singh while cycling on hills around Chenggong District

六、 学术活动 Academic Activities

学术报告 Colloquia

2017 年 11 月 12 日，Nami Mowlavi（日内瓦大学），21 世纪的大尺度巡天：盖亚的使命
2017 年 12 月 15 日，田海浚（三峡大学），银河系的恒星运动学
2017 年 12 月 21 日，赵文（中国科学技术大学），B-模宇宙学
2017 年 12 月 22 日，王青德（马萨诸塞大学），通过引力透镜探索黑洞天体物理学
2017 年 12 月 28 日，毛基荣（云南天文台），高红移 AGNs 的理论光度函数
2018 年 03 月 15 日，Giovanni Covone（那不勒斯费德里克二世大学），PSZ2LenS：宇宙学星系团完整样本的弱引力透镜分析
2018 年 03 月 22 日，龙潜（云南天文台），人工智能和机器学习
2018 年 04 月 03 日，沈俊太（上海天文台），棒旋星系中的气体流动模式和形成大质量黑洞的潜在机制
2018 年 04 月 09 日，范璐璐（山东大学威海分校），宇宙中最明亮、尘埃遮蔽的类星体的多波长研究
2018 年 04 月 11 日，马斌（国家天文台），南极洲与天文学——两次奇妙旅行的碰撞
2018 年 04 月 12 日，姜鹏（国家海洋局极地中心），由南极步入宇宙
2018 年 04 月 19 日，李志远（南京大学），球状星团和星系团中 X 射线源星族的新认识
2018 年 04 月 26 日，乔二林（国家天文台），吸积盘的蒸发和冕的凝结及其在不同尺度黑洞吸积盘系统中的应用
2018 年 05 月 03 日，张双南（中国科学院高能物理研究所），介绍“慧眼”硬 X 射线调制望远镜：中国第一颗 X 射线天文卫星
2018 年 05 月 10 日，崔辰州（国家天文台），从虚拟天文台到互动式数字天象厅
2018 年 05 月 17 日，景益鹏（上海交通大学），下一代大型星系光谱巡天
2018 年 05 月 23 日，刘超（国家天文台），用 Gaia 和 LAMOST 数据拥抱新时代——突破即将到来
2018 年 05 月 24 日，袁峰（上海天文台），孤立星系中活动星系核的反馈
2018 年 06 月 05 日，Syed Ashraf Uddin（北南大学），超新星：巡天及其宇宙学
2018 年 6 月 07 日，李立新（北京大学），中子星并合的瞬态事件：理论和观测
2018 年 6 月 12 日，Luciano Casarini（北里奥格兰德联邦大学），下一代的数值宇宙学
2018 年 06 月 14 日，王晓峰（清华大学），超新星的前身星：从热核爆发到核心塌缩
2018 年 06 月 21 日，袁业飞（中国科学技术大学），大质量黑洞双星的双重潮汐扰动
2018 年 06 月 25 日，Vitaly Neustroev（奥卢大学），相互作用的双星：其供体星、吸积盘和晚期演化
2018 年 07 月 05 日，Christian Wolf（澳大利亚国立大学），SkyMapper 望远镜南天区巡天
2018 年 07 月 16 日，戴新宇（俄克拉荷马州立大学），利用类星体微引力透镜效应限制河外星系行星级天体和超大质量黑洞周围环境
2018 年 07 月 24 日，郭仪成（密苏里大学），CANDELS：星系形成和演化的实时视图
2018 年 07 月 26 日，Gregory Green（斯坦福大学 / 国家加速器实验室），利用 Gaia 和 DECam 望远镜绘制三维尘埃
2018 年 07 月 26 日，陈斌（北京大学），Einstein-Gauss-Bonnet Gravity at large D
2018 年 09 月 12 日，白雪宁（清华大学），对原行星盘和行星行成的理解
2018 年 09 月 27 日，李成（清华大学），是什么驱动了星系的死亡？基于积分场光谱与 CO 强度绘制巡天的见解

2018 年 10 月 12 日，毛淑德（清华大学），MaNGA 星系的动力学模拟
2018 年 11 月 08 日，高煜（紫金山天文台），稠密分子气体中的整体恒星形成规律
2018 年 11 月 15 日，康熙（紫金山天文台），银河系的卫星星系
2018 年 11 月 22 日，陆由俊（国家天文台），星系中心大质量黑洞的自旋演化
2018 年 11 月 27 日，徐怡冬（国家天文台），氢再电离时期的拓扑结构演化与理论模拟
2018 年 11 月 29 日，东苏勃（北京大学），白矮星的直接碰撞——Ia 型超新星爆发的主要渠道
2018 年 12 月 04 日，林伟鹏（中山大学），利用多体/流体数值模拟研究星系分布和星系团际恒星成分
2018 年 12 月 05 日，苟利军（国家天文台），恒星质量级黑洞的自旋测量
2018 年 12 月 13 日，施勇（南京大学），宇宙学时标下的恒星形成史
2018 年 12 月 20 日，张江水（广州大学），河外超脉泽与活动星系核及星暴
2018 年 12 月 27 日，周旭（国家天文台），北京—亚利桑那巡天
2018 年 12 月 27 日，孔大力（上海天文台），JUNO 时代的木星研究与探测
2019 年 01 月 24 日，马伯强 （北京大学），超高能宇宙线的洛伦兹不变性的违背
2019 年 03 月 21 日，李柯伽（北京大学），利用脉冲星测时阵列探测太阳系
2019 年 03 月 25 日，Shuhrat EHGAMBERDIEV（兀鲁伯天文研究所），乌兹别克斯坦 Maidanak 天文台：现状与未来展望
2019 年 03 月 28 日，许丹丹（清华大学），强引力透镜与暗晕子结构
2019 年 04 月 11 日，杜福君（紫金山天文台），天体化学：从星际介质到太阳系的起源
2019 年 04 月 16 日，Mathias Schultheis（蔚蓝海岸大学），银河系考古学：基于大规模红外光谱巡天
2019 年 04 月 18 日，Cosimo Bambi（复旦大学），利用 X 射线反射谱检验广义相对论
2019 年 04 月 18 日，陈文屏（台湾中央大学），逐渐变小的恒星：寻找不同年龄及丰度的亚恒星天体
2019 年 04 月 24 日，李华白（香港中文大学），“太极”与恒星形成
2019 年 04 月 24 日，崔伟（清华大学），利用高分辨率 X 射线谱探测星系际热气体
2019 年 04 月 30 日，Oleg Tsupko（俄罗斯科学院空间研究所），黑洞阴影
2019 年 05 月 07 日，Oleg Tsupko（俄罗斯科学院空间研究所），等离子体中的引力透镜
2019 年 05 月 09 日，Thijs Kouwenhoven（西交利物浦大学），星团中的行星系统
2019 年 5 月 23 日，毛基荣（云南天文台），相对论电子在大尺度有序磁场和小尺度无序磁场中的极化
2019 年 05 月 28 日，Chandra Bahadur Singh（以色列特拉维夫大学），黑洞周围的吸积喷射过程（亮点和未来计划）
2019 年 05 月 29 日，Sami M. Dib（玻尔国际学院 & 马克斯·普朗克射电天文研究所），“1001”种恒星形成模型
2019 年 05 月 30 日，蔡一夫（中国科学技术大学），宇宙的加速膨胀：暗能量和 f (T)引力理论
2019 年 06 月 03 日，Takuya Akahori（日本国立天文台），宇宙的磁场：其起源与演化的挑战
2019 年 06 月 04 日，于浩然（上海交通大学），宇宙学模拟及最近的应用
2019 年 06 月 04 日，Hayato Shimabukuro（清华大学），利用人工神经网络进行 21cm 谱线信号分析
2019 年 06 月 05 日，安涛（上海天文台），国际 SKA 区域中心的现状和中国 SKA 数据中心原型机的研制进展
2019 年 06 月 06 日，王伟（武汉大学），利用伽马射线探测超新星的前身星
2019 年 06 月 10 日，薛永泉 （中国科学技术大学），钱德拉深场：让研究前沿科学的宽波段光谱成为可能
2019 年 06 月 13 日，张鹏杰（上海交通大学），除宇宙剪切以外的弱引力透镜分析
2019 年 06 月 20 日，Muinonen Karri Olavi（赫尔辛基大学），光在行星表层的散射和吸收
2019 年 06 月 21 日，闫慧荣（波茨坦大学），湍流及其天体物理学意义

2019 年 06 月 26 日，Cosimo Bambi（复旦大学），天体物理黑洞：综述
2019 年 06 月 27 日，王杰（国家天文台），在宇宙结构形成方向的一点进展
2019 年 07 月 04 日，王岚（国家天文台），近邻宇宙星系成团性研究——对于具有经典核球与“伪”核球的星系
2019 年 07 月 16 日，赖东（康奈尔大学），环双星吸积过程：从超大质量双黑洞到环双星行星
2019 年 08 月 13 日，朱兴江（蒙纳士大学），脉冲星，引力波和模糊暗物质
2019 年 08 月 28 日，Jenny Wanger（海德堡大学），模型无关的强引力透镜及其宇宙学和星系演化中的应用
2019 年 09 月 03 日，Gerhard Hensler（维也纳大学），潮汐矮星系的形成与生存
2019 年 09 月 19 日，徐烨（紫金山天文台），银河系的旋臂结构
2019 年 09 月 27 日，Gayoung Chon（慕尼黑大学），星系团内部物质结构的研究
2019 年 09 月 30 日，刘继峰（国家天文台），大样本黑洞质量分布
2019 年 10 月 11 日，戴子高（南京大学），双中子星并合事件
2019 年 10 月 16 日，樊晓晖（亚利桑那大学），宇宙黎明时期的极端类星体
2019 年 10 月 17 日，Ewine van Dishoeck（莱顿大学），利用 ALMA 探测原行星盘
2019 年 10 月 23 日，Thomas Hackman（赫尔辛基大学），观测恒星发电机的运行
2019 年 10 月 23 日，Giovanni Covonne（那不勒斯大学），弱引力透镜星系团的大尺度结构研究
2019 年 10 月 25 日，Toshi Futamase（日本东北大学），利用 Ia 型超新星的本动速度和透镜色散限制中微子质量和暗能量
2019 年 10 月 31 日，David Mota（奥斯陆大学），广义相对论之外引力理论的宇宙学和天体物理学探针
2019 年 11 月 01 日，李昂（厦门大学），中子星和夸克星：极端高密度下的物质状态是什么样子的？
2019 年 11 月 07 日，张波（上海天文台），射电星的 VLBI 天体测量
2019 年 11 月 11 日，郭新（香港大学），宇宙中的有机物
2019 年 11 月 21 日，江林华（北京大学），Magellan M2FS 在红移 z >= 6 的星系光谱巡天
2019 年 11 月 26 日，Laurent Pagani（法国国家科学研究中心），猎户座恒星形成区的复杂性——基于 ALMA 观测
2019 年 11 月 27 日，Juergen Schmitt（汉堡大学）， CARMENES 项目——搜寻 M 型星周围的系外行星
2019 年 11 月 28 日，路如森（上海天文台），看见看不见——利用亚毫米波甚长基线干涉对超大质量黑洞外围成像
2019 年 12 月 04 日，袁为民（国家天文台），爱因斯坦探针卫星——在时域天文领域的可能发现
2019 年 12 月 05 日，刘超（国家天文台），场双星动力学过程的证据
2019 年 12 月 10 日，季索清（加州理工学院），宇宙线主导的环星系介质
2019 年 12 月 26 日，郭琦（国家天文台），小星系，大挑战
2019 年 12 月 26 日，杨军（瑞典查尔姆斯理工大学），暂现源的极高分辨率射电天文观测研究的国际动态
2020 年 01 月 08 日，孟祥存（云南天文台），Ia 型超新星的高速光谱特征
2020 年 03 月 26 日，王建民（中国科学院高能物理研究所），宇宙学距离的几何测量
2020 年 04 月 02 日，沈世银（上海天文台），SDSS 巡天和 LAMOST 光谱巡天中的致密星系
2020 年 04 月 09 日，Daichi Kashino（苏黎世联邦理工学院），利用 Subaru/HSC 探测宇宙再电离末期
2020 年 04 月 16 日，黄志琦（中山大学），超新星星等演化与 Page 近似法
2020 年 04 月 23 日，Miho Kawabata（京都大学），对近邻星系中年轻 Ia 型超新星的快速跟踪观测

2020 年 04 月 30 日，David Garofalo（肯尼索州立大学），跨越时空的黑洞
2020 年 05 月 14 日，孙谋远（厦门大学），论超大质量黑洞的宇宙学增长
2020 年 05 月 21 日，冯麓（国家天文台），2017-2019 西部选址及阿里近地层大气湍流监测
2020 年 06 月 04 日，王俊贤（中国科学技术大学），再电离时期的 Lyman-α 星系
2020 年 06 月 18 日，郑振亚（上海天文台），中国空间站望远镜多通道成像仪载荷介绍
2020 年 07 月 02 日，冯骅（清华大学），重新打开天文学软 X 射线偏振测量的窗口
2020 年 07 月 09 日，张泳（中山大学），太空中的氢化富勒烯（FullerAnes）
2020 年 07 月 10 日，张居甲（云南天文台），新型瞬变源与 Mephisto 巡天策略探讨
2020 年 08 月 12 日，袁峰（上海天文台），AGN 反馈的数值研究
2020 年 09 月 03 日，Keiichi Umetsu（中央研究院天文及天文物理研究所），利用星系团的弱引力透镜揭示宇宙的结构形成
2020 年 09 月 10 日，赵公博（国家天文台），eBOSS 巡天第 16 批数据的宇宙学意义
2020 年 09 月 17 日，赵文（中国科学技术大学），引力波与引力检验
2020 年 09 月 17 日，陈兆庭（曼彻斯特大学），从中性氢成像中提取天体物理信息——功率和极限
2020 年 09 月 24 日，Takuya Hashimoto（筑波大学），利用 ALMA 望远镜探测高红移星系的性质

November 12, 2017, Nami Mowlavi (University of Geneva), Large-scale surveys in the 21st century: the Gaia mission
December 15, 2017, Haijun Tian (China Three Gorges University), The stellar kinematics in our Milky Way
December 21, 2017, Wen Zhao (University of Science and Technology of China), B-mode cosmology
December 22, 2017, Q. Daniel Wang (University of Massachusetts), Probing black hole astrophysics through gravitational lensing
December 28, 2017, Jirong Mao (YNAO), Theoretical luminosity function of the high-redshift AGNs
March 15, 2018, Giovanni Covone (Università degli Studi Federico II), PSZ2LenS: weak lensing analysis of a complete sample of galaxy clusters for cosmology
March 22, 2018, Qian Long (YNAO), Artificial intelligence and machine learning
April 03, 2018, Juntai Shen (Shanghai Astronomical Observatory), Gas flow patterns in barred galaxies and a potential mechanism to seed massive black holes
April 09, 2018, Lulu Fan (Shandong University, Weihai), Multiwavelength studies of the most luminous, dust-obscured quasars in the universe
April 11, 2018, Bin Ma (NAOC), Antarctica and Astronomy - the collision of two fantastic trips
April 19, 2018, Zhiyuan Li (Nanjing University), New insights on the X-ray Source Poluation in Globular Clusters and Galaxy Clusters
April 26, 2018, Erlin Qiao (NAOC), Evaporation of the accretion disks and condensation of the corona and their applications to black hole - accretion disk systems of different scales
May 03, 2018, Shuangnan Zhang (IHEP, CAS), Introduction to Insight-HXMT: China's first X-ray Astronomy Satellites
May 10, 2018, Chenzhou Cui (NAOC), From virtual observatory to interactive digital planetarium
May 17, 2018, Yipeng Jing (Shanghai Jiao Tong University), Next generation large scale spectroscopy surveys of galaxies
May 14, 2018, Feng Yuan (SHAO), Active galactic nuclei feedback in an isolated galaxy
June 05, 2018, Syed Ashraf Uddin (North South University), Supernovae: Surveys and Cosmology
June 07, 2018, Lixin Li (Peking University), Transient events from neutron star mergers: theory and observation

June 12, 2018, Luciano Casarini (Federal University of Rio Grande North), Numerical cosmology for next generations
June 14, 2018, Xiaofeng Wang (Tsinghua University), The progenitors of supernovae: from thermonuclear explosion to core collapse
June 21, 2018, Yefei Yuan (University of Science and Technology of China), Double tidal disruption events with massive black hole binaries
June 25, 2018, Vitaly Neustroev (University of Oulu), Interacting binaries: their donor stars, accretion discs and late evolution
July 05, 2018, Christian Wolf (Australian National University), The SkyMapper Southern Survey
July 16, 2018, Xinyu Dai (University of Oklahoma), Constraining Planet Mass-Scale Objects in Extragalactic Galaxies and Immediate Environment around Supermassive Black Holes with Quasar Microlensing
July 24, 2018, Yicheng Guo (University of Missouri), CANDELS: Live Views of Gaiaxy Formation and Evolution
July 26, 2018, Gregory Green (Stanford/SLAC), Mapping Dust in 3D with Gaia and DECam
July 26, 2018, Bin Chen (Peking University), Einstein-Gauss-Bonnet Gravity at large D
September 12, 2018, Xuening Bai (Tsinghua University), Towards Realistic Understandings of Protoplanetary Disks and Planet Formation
September 27, 2018, Cheng Li (Tsinghua University), What drives galaxy quenching? Insights from integral field spectroscopy and CO intensity mapping surveys
October 12, 2018, Shude Mao (Tsinghua University), Dynamical modeling of MaNGA galaxies
November 08, 2018, Yu Gao (Purple Mountain Observatory), The Global Star Formation Law in Dense Molecular Gas
November 15, 2018, Xi Kang (Purple Mountain Observatory), Milky Way Satellite galaxies
November 22, 2018, Youjun Lu (NAOC), Spin Evolution of Massive Black Holes in Galactic Centers
November 27, 2018, Yidong Xu (NAOC), Topological Evolution and Theoretical Modeling of Hydrogen Reionization
November 27, 2018, Subo Dong (Peking University), Direct collision of white dwarfs as a major channel for type Ia supernovae explosions
December 04, 2018, Weipeng Lin (Sun Yat-sen University), Studying the galaxy distribution and intercluster stellar component using N-body/ Hydrodynamical simulations
December 05, 2018, Lijun Gou (NAOC), Review to the stellar-mass black hole spin measurement
December 13, 2018, Yong Shi (Nanjing University), Star formation across Cosmic Time
December 20, 2018, Jiangshui Zhang (Guangzhou University), Megamasers & AGN, Starburst
December 27, 2018, Xu Zhou (NAOC), The Beijing-Arizona Sky Survey
December 27, 2018, Dali Kong (SHAO), Jupiter Study and Detection in the JUNO era
January 24, 2019, Boqiang Ma (Peking University), Lorentz Invariance Violation from Ultrahigh Energy Cosmic Rays
March 21, 2019, Kejia Lee (Peking University), Probing the solar system using pulsar timing array
March 25, 2019, Shuhrat EHGAMBERDIEV (UBAI), The Maidanak Observatory in Uzbekistan: Present Status and Future Prospects
March 28, 2019, Dandan Xu (Tsinghua University), Strong Lensing and Substructures
April 11, 2019, Fujun Du (Purple Mountain Observatory), Astrochemistry: from interstellar medium to the origin of solar system
April 16, 2019, Mathias Schultheis (Université Côte d’Azur), Galactic Archeology using large spectroscopic surveys in the Infrared: The APOGEE (SDSS-IIII/IV) survey and the MOONS project
April 18, 2019, Cosimo Bambi (Fudan University), Testing general relativity using X-ray reflection spectroscopy

April 18, 2019, Wenping Chen (National Central University), Dwindle, Dwindle Little Stars - Hunting for Substellar Objects Young and Old Rich and Poor
April 24, 2019, Huabai Li (The Chinese University of Hong Kong), Tai Chi Inspired by Star Formation
April 24, 2019, Wei Cui (Tsinghua University), Probing Hot Circumgalactic and Intergalactic Gas with High-Resolution X-ray Spectroscopy
April 30, 2019, Oleg Tsupko (IKI), Black hole shadow
May 07, 2019, Oleg Tsupko (IKI), Gravitational lensing in plasma
May 09, 2019, Thijs Kouwenhoven (Xi'an Jiaotong-liverpool University), Planetary systems in star clusters
May 23, 2019, Jirong Mao (YNAO), Polarization of relativistic electrons in both ordered & large-scale and random & small-scale magnetic field
May 28, 2019, Chandra Bahadur Singh (Tel Aviv University), Accretion-Ejection Processes around Black Holes (Highlights and Future Plans)
May 29, 2019, Sami M. Dib (NBIA & MPIA), The 1001 modes of Star Formation
May 30, 2019, Yifu Cai (University of Science and Technology of China), An Overview on Cosmic Acceleration of the present Universe: Dark Energy & f (T) Gravity
June 03, 2019, Takuya Akahori (National Astronomical Observatory of Japan), Cosmic Magnetism: Challenge to its Origin and Evolution in Our Universe
June 04, 2019, Haoran Yu (Shanghai Jiao Tong University), Cosmological simulations and recent applications
June 04, 2019, Hayato Shimabukuro (Tsinghua University), 21cm signal analysis with artificial neural networks
June 05, 2019, Tao An (SHAO), Current Situation of SKA Regional Center and Research Progress of SKA Data Center Prototype in China
June 06, 2019, Wei Wang (Wuhan University), Probe of Supernova Progenitors with Gamma-rays
June 10, 2019, Yongquan Xue (University of Science and Technology of China), The Chandra Deep Fields: Enabling a Wide Spectrum of Exciting Science
June 13, 2019, Pengjie Zhang (Shanghai Jiao Tong University), Weak lensing beyond cosmic shear
June 20, 2019, Muinonen Karri Olavi (University of Helsinki), Scattering and absorption of light in planetary regoliths
June 21, 2019, Huirong Yan (Postdam University), Turbulence and its Astrophysical Implications
June 26, 2019, Cosimo Bambi (Fudan University), Astrophysical Black Holes: A Review
June 27, 2019, Jie Wang (NAOC), Some Progress on Cosmic Structure Formation
July 04, 2019, Lan Wang (NAOC), The clustering of galaxies with pseudo-bulge and classical bulge in the local Universe
July 16, 2019, Dong Lai (Cornell University), Circumbinary Accretion: From Supermassive Binary Black Holes to Circumbinary Planets
August 13, 2019, Xingjiang Zhu (Monash University), Pulsars, gravitational waves and fuzzy dark matter
August 28, 2019, Jenny Wanger (Heidelberg University), Model-independent strong gravitational lensing and its applications in cosmology and galaxy evolution
September 03, 2019, Gerhard Hensler (Vienna University), The formation and survival of Tidal-tail Dwarf Galaxies
September 19, 2019, Ye Xu (Purple Mountain Observatory), The Spiral Structure of the Milky Way
September 27, 2019, Gayoung Chon (Munchi), Structural studies of the ICM in galaxy clusters
September 30, 2019, Jifeng Liu (NAOC), Large sample of black hole mass distribution
October 11, 2019, Zigao Dai (Nanjing University), Binary Neutron Star Mergers
October 16, 2019, Xiaohui Fan (Arizona University), Extreme Quasars During the Cosmic Dawn

October 17, 2019, Ewine van Dishoeck (Leiden University), Zooming in on protoplanetary disks with ALMA
October 23, 2019, Thomas Hackman (Helsinki University), Observing stellar dynamos in action
October 23, 2019, Giovanni Covonne (Università degli studi di Napoli Federico II), Studying the large-scale structure around galaxy clusters with weak gravitational lensing
October 25, 2019, Toshi Futamase (Tohoku University), Constraining neutrino mass and dark energy with peculiar velocities and lensing dispersions of Type Ia supernovae
October 31, 2019, David Mota (University of Oslo), Cosmological and Astrophysical probes of Gravity Theories beyond General Relativity
November 01, 2019, Ang Li (Xiamen University), Neutron star and quark star: What is the matter state at exceedingly high density
November 07, 2019, Bo Zhang (SHAO), The astrometry of radiostar by VLBI
November 11, 2019, Sun Kwok (The University of Hong Kong), Organic Matter in the Universe
November 21, 2019, Linhua Jiang (Peking University), A Magellan M2FS Spectroscopic Survey of Galaxies at Redshift >= 6
November 26, 2019, Laurent Pagani (CNRS, France), The Complexity of Orion: An ALMA view
November 27, 2019, Juergen Schmitt (Hamburg University), The CARMENES search for extrasolar planets around M stars
November 28, 2019, Rusen Lu (SHAO), Seeing the invisible: imaging nearby supermassive black holes with (sub)mm-VLBI
December 04, 2019, Weimin Yuan (NAOC), The science of the Einstein Probe mission - enabling discoveries in time-domain astronomy
December 05, 2019, Chao Liu (NAOC), Evidence of dynamical processing of the field binary stars
December 10, 2019, Suoqing Ji (Caltech), The Cosmic Ray-Dominated Circumgalactic Medium
December 26, 2019, Qi Guo (NAOC), Small galaxies, big challenges
December 26, 2019, Jun Yang (CTH), International developments of very high-resolution radio astronomical observations from transient sources
January 08, 2020, Xiangcun Meng (YNAO), High-velocity feature as the indicator of stellar population of Type Ia supernovae
March 26, 2020, Jianmin Wang (The Institute of High Energy Physics of the Chinese Academy of Sciences), Geometric measurement of cosmological distance
April 02, 2020, Shiyin Shen (SHAO), Compact galaxy systems in Sloan Digital Sky Survey and LAMOST spectral survey
April 09, 2020, Daichi Kashino (ETH), Exploring the tail end of reionization with Subaru/HSC
April 16, 2020, Zhiqi Huang (Sun Yat-sen University), Supernova Magnitude Evolution and PAge Approximation
April 23, 2020, Miho Kawabata (Kyoto University), Rapid follow-up observations of young Type Ia supernovae in the nearby galaxy
April 30, 2020, David Garofalo (Kennesaw State), Black holes across space and time
May 14, 2020, Mouyuan Sun (Xiamen University), On the Cosmological Growth of Supermassive Black Holes
May 21, 2020, Lu Feng (NAOC)Brief review of the site testing campaign in western part of China, 2017-2019 and ground layer turbulence monitor results at Ali site
June 04, 2020, Junxian Wang (USTC), Lyman Alpha Galaxies in the Epoch of Reionization
June 18, 2020, Zhenya Zheng (SHAO) Introduction of the Multi-channel Imager payload for Chinese Space Station Telescope
July 02, 2020, Hua Feng (Tsinghua University), Reopening the window of astronomical soft X-ray polarimetry

July 09, 2020, Yong Zhang (Sun Yat-sen University), Hydrogenated Fullerenes (FullerAnes) in space
July 10, 2020, Jujia Zhang (YNAO), Discussion of the new transient source and Mephisto Sky Survey Strategy
August 12, 2020, Feng Yuan (SHAO), Numerical study of AGN feedback
September 03, 2020, Keiichi Umetsu (ASIAA), Unveiling Cosmic Structure Formation by Cluster Weak Lensing
September 10, 2020, Gongbo Zhao (NAOC), Cosmological implications of the eBOSS DR16 observations
September 17, 2020, Wen Zhao (USTC), Gravitational wave and gravitational test
September 17, 2020, Zhaoting Chen (University of Manchester), Exploring the Power and Limits of Extracting Astrophysics from Interferometric Hi Intensity Mapping
September 24, 2020, Takuya Hashimoto (Tsukuba University), Properties of galaxies at z = 6 - 9 revealed by ALMA

午餐讨论会 Lunch talks

2017 年 11 月 20 日，王博（云南天文台），质量增长白矮星的长期演化
2017 年 11 月 27 日，尔欣中（云南大学中国西南天文研究所），弱透镜高阶效应
2017 年 12 月 04 日，方军（云南大学物理与天文学院），超新星遗迹的粒子加速过程和辐射形态
2017 年 12 月 11 日，陶嘉琳（清华大学），我们对黑暗的宇宙了解多少？
2017 年 12 月 18 日，董小波（云南天文台），中等质量黑洞和冷暗物质的小尺度问题研究
2017 年 12 月 25 日，谢利智（Trieste 天文台），晚型星系的形成和尺度的演化的半解析模型
2018 年 02 月 19 日，Syed Ashraf Uddin（紫金山天文台），宿主星系对 Ia 型超新星宇宙学的影响
2018 年 03 月 01 日，刘德子（云南大学中国西南天文研究所/上海师范大学/北京大学），VOICE 巡天中的弱引力透镜研究
2018 年 03 月 26 日，孙晓辉（云南大学物理与天文学院），射电天空
2018 年 04 月 09 日，Nami Mowlavi（日内瓦大学），主序上方的变星
2018 年 04 月 23 日，郭建恒（云南天文台），太阳系外行星大气逃逸的研究
2018 年 05 月 04 日，封海成（云南天文台），9 个窄线 Seyfert 1 星系的反响映射
2018 年 05 月 07 日，侯贤（云南天文台），利用 Fermi-LAT 观测到的来自银河系和仙女座中心的伽马射线
2018 年 05 月 24 日，李百乐（上海天文台），轴对称星系中的超大质量黑洞双星并和: 轨道观点
2018 年 05 月 25 日，柳莉杰（牛津大学），WISDOM 计划 — 盒荚状 NGC4429 中的巨分子云
2018 年 05 月 28 日，张居甲（云南天文台），不断扩大的超新星家谱
2018 年 06 月 04 日，陈雪飞（云南天文台），双星演化中的问题
2018 年 06 月 11 日，闫大海（云南天文台），耀变体的高能辐射
2018 年 06 月 15 日，李安琪（南京大学）， M31 核区行星状星云: 证认及光谱观测
2018 年 06 月 25 日，李忠木（大理大学），星族的合成及其应用
2018 年 07 月 27 日，李小虎（国家天文台），渐近巨星分支星的星周包层中的分子
2018 年 09 月 17 日，王守成（国家天文台），流形改正算法在非保守和耗散限制性三体问题中的应用
2018 年 09 月 26 日，Sarah Ann Bird（国家天文台），来自 LAMOST 和 Gaia 的银河系质量轮廓研究

2018 年 10 月 08 日，王海峰（云南大学中国西南天文研究所），银河系外盘再探——基于 Gaia 和 LAMOST 重新发现银盘的外围
2018 年 10 月 15 日，刘栋栋（云南天文台），Ia 型超新星前身星研究与中等质量脉冲双星的形成
2018 年 10 月 22 日，方玄（香港大学），行星状星云作为恒星和星系演化的探针
2018 年 11 月 06 日，李程远（麦考瑞大学），星团中的多星族
2018 年 12 月 03 日，姜登凯（云南天文台），双星演化与星团中特殊天体的形成
2018 年 12 月 12 日，韦成亮（紫金山天文台），利用全天弱引力透镜模拟探寻星系内禀指向的一致性
2018 年 12 月 26 日，祝伟（加拿大天体物理研究所），行星系统概览
2019 年 01 月 04 日，富坚（上海天文台），基于星系形成半解析模型的半径分解的星系盘模型
2019 年 01 月 10 日，孟晓磊（清华大学），高红移（z≥0.9）紫外增峰椭圆星系的起源与演化
2019 年 02 月 28 日，李静（西华师范大学），银晕中的子结构与 M 型红巨星
2019 年 03 月 11 日，钟靖（上海天文台），双星团 h and chi Persei 中的晕与子结构
2019 年 03 月 18 日，史晶晶（北京大学），Infall halo 与卫星星系研究——基于 IllustrisTNG 宇宙学模拟
2019 年 03 月 20 日，方圆（云南大学），高效用 Co-location 模式挖掘
2019 年 03 月 25 日，杜敏（北京大学），大质量星系附近的致密椭圆星系的形成
2019 年 04 月 04 日，崔昱东（中山大学），超新星遗迹与分子云碰撞——基于 Fermi-LAT 分析和强子模拟
2019 年 04 月 08 日，张佳骏（上海交通大学），暗物质与暗能量存在相互作用吗？
2019 年 04 月 15 日，邹思蔚（北京大学），利用类星体吸收线探测高红移星系内部和周围的气体
2019 年 04 月 22 日，张淼淼（马克斯·普朗克天文研究所），恒星形成率模型的检验：银河系巨分子云的内部结构与恒星形成活动
2019 年 04 月 24 日，顾为民（厦门大学），利用 LAMOST 光谱数据寻找恒星质量级黑洞候选体
2019 年 04 月 29 日，陈迪昌（南京大学），白矮星的金属污染和恒星盘的一种演化模式
2019 年 05 月 13 日，李兆聿（上海交通大学/上海天文台），相空间蜗牛状的解析
2019 年 05 月 20 日，徐伟伟（北京大学/国家天文台），星系团的 X 射线波段探测
2019 年 05 月 27 日，李海宁（国家天文台），大规模巡天时代的银河系早期历史探测
2019 年 06 月 03 日，王善钦（广西大学），超光度超新星的能量来源
2019 年 06 月 10 日，龙凤（北京大学）,从原行星盘的 ALMA 观测中发现行星形成的新线索
2019 年 06 月 17 日，杨明（南京大学），星震学前沿研究进展
2019 年 06 月 24 日，吴程远（云南天文台），吸积白矮星及其相关天体研究
2019 年 08 月 22 日，王界双（上海交通大学），中子星并合的电磁对应体
2019 年 08 月 23 日，赵小舟（鲁汶大学），磁通量绳爆发的 2.5 维磁流体动力学模拟
2019 年 08 月 26 日，李佳文（上海天文台），薄吸积盘在大尺度磁场驱动下的外流及其在高红移超大质量黑洞快增长过程中的应用
2019 年 09 月 10 日，王雯思（中国科学技术大学），太阳磁通量绳形成与演化过程
2019 年 09 月 24 日，闫洪亮（国家天文台），富锂巨星及其起源
2019 年 10 月 18 日，刘尚飞（中山大学），气态巨行星的形成：对木星稀释核的新理解
2019 年 10 月 21 日，袁珍（上海天文台），银晕演化的动力学遗迹
2019 年 11 月 07 日，易卫敏（美国宾夕法尼亚州立大学），探测类星体风：宽吸收线变化的启示
2019 年 11 月 11 日，周渝涛（北京大学），LAMOST 大样本富锂巨星的高分辨率光谱分析
2019 年 11 月 18 日，李兆州（上海交通大学），利用卫星星系相空间分布限制银河系的质量轮廓

2019 年 11 月 25 日，常江（紫金山天文台），计算机中的银河系
2019 年 11 月 27 日，Panagiotis Ioannidis（德国汉堡大学）,快速旋转的 AB Doradus 的生命中的一年
2019 年 11 月 29 日，任逸（北京师范大学），本星系群中红超巨星的周光关系
2019 年 12 月 02 日，符晓婷（北京大学）增加 α 增丰以及新热改正的恒星演化模型：PARSEC
2019 年 12 月 26 日，陈卓（加拿大阿尔伯塔大学）AGB 双星的质量传递
2019 年 12 月 27 日，韩家信（上海交通大学）,暗物质晕的准平衡结构：从理论到观测
2020 年 01 月 15 日，李楠（国家天文台），大数据时代的强引力透镜研究
2020 年 03 月 23 日，刘良端（北京师范大学）,超光度超新星和快速光学瞬变源
2020 年 03 月 30 日，伊团（厦门大学）,双星舞会：恒星和它看不见的伴侣
2020 年 04 月 15 日，苑海波（北京师范大学）,J-PLUS 巡天毫星等精度的定标及其应用
2020 年 04 月 20 日，王舒（国家天文台），对于光学至中红外波段经典消光规律 Rv=3.1 的修正
2020 年 04 月 24 日，陈孝钿（国家天文台），大数据时代的数百万个周期性变星
2020 年 04 月 27 日，成忠群（武汉大学），银河系球状星团的钱德拉 X 射线观测
2020 年 05 月 11 日，蔡振翼（中国科学技术大学）在时域天文学时代利用 AGN 的光变检验吸积盘理论
2020 年 05 月 18 日，欧建文（中山大学），星震学：从恒星到行星
2020 年 05 月 25 日，余海（上海交通大学），以强引力透镜效应作为“巨型望远镜”定位引力波事件的宿主星系
2020 年 06 月 08 日，张志祥（厦门大学），对类星体 3C 272 的十年反响映射观测
2020 年 06 月 15 日，侯立刚（国家天文台），银河系的悬臂结构
2020 年 06 月 22 日，姜晨（中山大学），通过星震学测量恒星的年龄
2020 年 06 月 29 日，丁浙杰（上海交通大学），大尺度巡天中的重子声学振荡探测
2020 年 07 月 13 日，Jordy Davelaar（拉德堡德大学），事件视界尺度的黑洞吸积
2020 年 08 月 31 日，李璐（上海天文台），疏散星团 NGC3532 中的双星及其动力学相互作用证据
2020 年 09 月 07 日，邹思蔚（北京大学科维里天体物理研究所），一个碳增丰的莱曼极限系统：第一代恒星的信号？
2020 年 09 月 28 日，刘牛（南京大学），Gaia 时代的天文参考坐标架
2020 年 10 月 12 日，刘前程（南京大学），超新星遗迹与分子云的相互作用系统
2020 年 10 月 13 日，李文雄（清华大学），Ia 型超新星及其引力透镜现象

November 20, 2017, Bo Wang (YNAO), Long-term evolution of mass-accreting white dwarfs
November 27, 2017, Xinzhong Er (SWIFAR), Weak gravitational lensing flexion
December 04, 2017, Jun Fang (YNU), Particle acceleration process and radiation morphology in supernovae remnants
December 11, 2017, Charling Tao (Tsinghua University), What do we know about the Dark Universe?
December 18, 2017, Xiaobo Dong (YNAO), Studies on intermediate-mass black holes and on the small-scale problems of cold dark matter
December 25, 2020, Lizhi Xie (Astronomical Observatory of Trieste), The semi-analytic model of galaxy formation and size evolution of late-type galaxies
February 19, 2018, Syed Ashraf Uddin (Purple Mountain Observatory), The influence of host galaxies in type Ia supernova cosmology
March 01, 2018, Dezi Liu (SWIFAR/ SHNU/ Peking University), Weak Lensing Study in VOICE Survey
March 26, 2018, Xiaohui Sun (YNU), Radio sky
April 09, 2018, Nami Mowlavi (University of Geneva), Stellar variability on the upper main-sequence

April 23, 2018, Jianheng Guo (YNAO), Studies on the atmospheric escape of extroplanets
May 04, 2018, Haicheng Feng (YNAO), Reverberation Mapping for 9 Narrow Line Seyfert 1 Galaxies
May 07, 2018, Xian Hou (YNAO), Gamma Rays from the Centers of the Milky Way and Andromeda Seen with the Fermi-LAT
May 24, 2018, Baile Li (SHAO), Supermassive Black Hole Binary Mergers within Axisymmetric Galaxies: An orbital Perspective
May 25, 2018, Lijie Liu (University of Oxford), WISDOM Project -- Giant Molecular Clouds in the boxy lenticular NGC4429
May 28, 2018, Jujia Zhang (YNAO), An expanding supernovae family
June 04, 2018, Xuefei Chen (YNAO), Problems in binary evolution
June 11, 2018, Dahai Yan (YNAO), High-energy radiation of Blazars
June 15, 2018, Anqi Li (Nanjing University), Planetary Nebulae in the Circumnuclear Region of M31: Identification and Spectroscopic Observation
June 25, 2018, Zhongmu Li (Dali University), Stellar Population Synthesis and its Application
July 27, 2018, Xiaohu Li (NAOC), Molecules in the Circumstellar Envelopes of Asymptotic Giant Branch Stars
September 17, 2018, Shoucheng Wang (NAOC), Velocity Scaling Correction Method for Non-conservative and Dissipative Restricted Three-body Problems
September 26, 2018, Sarah Ann Bird (NAOC), Galactic Mass and Anisotrpy Profiles with Halo Stars from LAMOST and Gaia
October 08, 2018, Haifeng Wang (SWIFAR), Rediscovering the outskirts of the Galactic disk with Gaia and LAMOST
October 15, 2018, Dongdong Liu (YNAO), Studies of the type Ia supernovae progenitors and the formation of the intermediate-mass binary pulsars
October 22, 2018, Xuan Fang (HKU), Planetary Nebulae as Probes of the Stellar and Galaxy Evolution
November 06, 2018, Chengyuan Li (Macquarie University), Multiple stellar populations in star clusters
December 03, 2018, Dengkai Jiang (YNAO), Binary evolution and special celestial bodies formation in star clusters
December 12, 2018, Chengliang Wei (Purple Mountain Observatory), Exploring Galaxy Intrinsic Alignment with Full-sky Weak Lensing Simulation
December 26, 2018, Wei Zhu (Canadian Institute for Theoretical Astrophysics), An Inclusive View of Planetary Systems
January 04, 2019, Jian Fu (SHAO), Radial resolved galaxy disks models based on semi-analytic models of galaxy formation
January 10, 2019, Xiaolei Meng (Tsinghua University), The origin and evolution of UV-upturn elliptical galaxies in Hubble Frontier Fields at $z \geq 0.9$
February 28, 2019, Jing Li (CWNU), M giants and substructure detected in the Galactic halo
March 11, 2019, Jing Zhong (SHAO), The substructure and halo population of the Double Cluster h and chi Persei
March 18, 2019, Jingjing Shi (Peking University), Infall halo and satellite galaxies - a study with IllustrisTNG
March 20, 2019, Yuan Fang (SWIFAR), High Quality Co-location Pattern Mining
March 25, 2019, Min Du (Peking University), The formation of compact elliptical galaxies in the vicinity of a massive galaxy
April 04, 2019, Yudong Cui (SYSU), SNRs colliding with molecular clouds, via Fermi-LAT analysis & hadronic modeling
April 08, 2019, Jiajun Zhang (SJTU), Does dark matter interact with dark energy?

April 15, 2019, Siwei Zou (Peking University), Using quasar absorption lines to probe gas in and around high-z galaxies
April 22, 2019, Miaomiao Zhang (MPIA), Testing star formation rate models: the internal structures and star formation activities in the Galactic giant molecular clouds
April 24, 2019, Weimin Gu (Xiamen University), Searching for stellar-mass black hole candidates by LAMOST spectra
April 29, 2019, Dichang Chen (Nanjing University), An evolution scenario for metal pollution and circumstellar disks of white dwarfs
May 13, 2019, Zhaoyu Li (SJTU/SHAO), Dissecting the phase space snail
May 20, 2019, Weiwei Xu (Peking University/NAOC), Detection of galaxy clusters in X-ray wavelength
May 27, 2019, Haining Li (NAOC), Exploring the early history of Milky Way in the era of large scale survey
June 03, 2019, Shanqin Wang (Guangxi university), The Energy Sources of Superluminous Supernovae
June 10, 2019, Feng Long (Peking University), Shedding new light on planet formation from ALMA observations of protoplanetary disks
June 17, 2019, Ming Yang (Nanjing University), Some Research Frontiers of Asteroseismology
June 24, 2019, Chengyuan Wu (YNO), Accreting white dwarfs and the related objects
August 22, 2019, Jieshuang Wang (SJTU), Electromagnetic counterparts of the neutron star merger
August 23, 2019, Xiaozhou Zhao (CmPA, KU Leuven), 2.5-dimensional MHD simulation of magnetic flux rope eruption
August 26, 2019, Jiawen Li (SHAO), Outflows driven by large-scale magnetic field from thin accretion disk and the application to the fast growth of high-z SMBHs
September 10, 2019, Wensi Wang (USTC), Formation and evolution of solar magnetic flux rope
September 24, 2019, Hongliang Yan (NAOC), The Lithium-rich Giants and Their origins
October 18, 2019, Shangfei Liu (Sun Yat-sen University), A Tale of Gas Giant Planet Formation: new insights into Jupiter's diluted core
October 21, 2019, Zhen Yuan (SHAO), Dynamical Relics of The Ancient Galactic Halo
November 07, 2019, Weimin Yi (Pen State Univ.), Probing quasar winds: implications from broad absorption line (BAL) variability
November 11, 2019, Yutao Zhou (NAOC/PKU), High-resolution Spectroscopic Analysis of a Large Sample of Li-rich Giants Found By LAMOST
November 18, 2019, Zhaozhou Li (STJU), Constraining the Milky Way Mass Profile with Phase-Space Distribution of Satellite Galaxies
November 25, 2019, Jiang Chang (Purple Mountain Observatory, Chinses Academy of Science), Galaxies in Computer
November 27, 2019, Panagiotis Ioannidis (Hamburg University), One year in the life of the fast rotator AB Doradus
November 29, 2019, Yi Ren (BNU), The Period-Luminosity Relations of Red Supergiants in the Local Group Galaxies
December 02, 2020, Xiaoting Fu (PKU), PARSEC: New evolutionary tracks/isochrones with alpha-enhancement and a new bolometric correction database
December 26, 2020, Zhuo Chen (University of Alberta), Wind mass transfer in AGB binaries
December 27, 2020, Jiaxin Han (SJTU), The quasi-equilibrium structure of dark matter halos: from theory to observation
January 15, 2020, Nan Li (NAOC), Strong Gravitational Lensing in the Big Data Era

March 23, 2020, Liangduan Liu (BNU), The Physics of Superluminous Supernovae and Fast Optical Transients
March 30, 2020, Tuan Yi (XiemenUniversity), Dancing Party of Binaries: A Story of Stars and Their Dark Companions
April 15, 2020, Haibo Yuan (BNU), Calibration of the J-PLUS survey to a few mmag precision and implications
April 20, 2020, Shu Wang (NAOC), The Optical to Mid-Infrared Extinction Law--An Adjustment to the Classic Rv=3.1 Extinction Law
April 24, 2020, Xiaodian Chen (NAOC), Millions of periodic variables in the era of big data
April 27, 2020, Zhongqun Cheng (WuhanUniversity), A Chandra Survey of Milky Way Globular Clusters
May 11, 2020, Zhen-Yi Cai (USTC), AGN variability testing accretion disk theory in the era of time domain astronomy
May 18, 2020, Jianwen Ou (Sun Yat-sen University), Asteroseismology: from star to planet
May 25, 2020, Hai Yu (SJTU), Strong lensing as a giant telescope to localize the host galaxy of gravitational wave event
June 18, 2020, Zhixiang Zhang (Xiamen University), A 10-yr RM observation of 3C 273
June 15, 2020, Ligang Hou (NAOC), The spiral structure of the Milky Way Galaxy
June 22, 2020, Chen Jiang (Sun Yat-sen University), Stellar ages from asteroseismology
June 29, 2020, Zhejie Ding (SJTU), The detection of Baryon Acoustic Oscillations from large-scale surveys
July 13, 2020, Jordy Davelaar (Radboud University), Black hole accretion on event horizon scales
August 31, 2020, Lu Li (SHAO)The binary stars in the open cluster NGC3532 and evidence for the dynamical interaction
September 07, 2020, Siwei Zou (KIAA-PKU), A Carbon-enhanced Lyman Limit System: Signature of the First Generation of Stars?
September 28, 2020, Niu Liu (NJU), Reference Frames in the era of Gaia
October 12, 2020, Qiancheng Liu (NJU), The Supernova Remnant and Molecular Cloud Interacting System
October 13, 2020, Wenxiong Li (THU), Type Ia supernova and its Gravitational Lensing phenomenon

文献研讨会 Journal Club

• 教师文献研讨会 Faculty Journal Club

2019 年 03 月 12 日，石洵，极端放大下的宇宙
2019 年 03 月 19 日，刘项琨，通过透镜和红移空间畸变对引力进行测试
2019 年 03 月 26 日，黄样，银河系内晕中发生了什么？
2019 年 04 月 16 日，方圆，星流的发现：一种新的探测星流的算法
2019 年 04 月 23 日，刘德子，知与未知：活动星系核的光变
2019 年 05 月 14 日，王海峰，最近两篇银河系星震学进展的综述：外盘的不对称性和晕的吸积
2019 年 10 月 15 日，杨元培，引力波宇宙学
2019 年 10 月 29 日，刘项琨，用最亮星系团的椭率作为示踪剂来研究晕的方向和弱引力透镜质量的偏差
2019 年 11 月 12 日，刘德子，用 HSC 巡天的暂变源来搜寻透镜类星体

2019 年 11 月 19 日，王海峰，在过去 16 年的 SDSS 巡天数据中星系的尺度分布
2019 年 12 月 06 日，方圆，银河系晕中的星流在项空间中的相关性：Kshir and GD-1 星流的争论
2019 年 12 月 10 日，尔欣中，斯隆数字二期巡天的超新星巡天：技术总结
2019 年 12 月 24 日，夏莼，日冕的产生和随后的大气加热
2019 年 12 月 31 日，陈丙秋，CFIS 巡天：从其白矮星族群重建银河系恒星形成历史
2020 年 03 月 16 日，黄样，在 GD-1 星流中探测到了本轮运动导致的峰值信号，一个没有子暗物质晕影响的证据？
2020 年 03 月 31 日，李广兴，一个在太阳附近的星系尺度的气体波
2020 年 03 月 24 日，杨元培，当强波与周围介质相互作用时产生的快速射电爆
2020 年 04 月 07 日，Hayato，用 21cm 森林限制超轻暗物质粒子的性质
2020 年 04 月 14 日，Chandra，黑洞吸积盘中的磁重联和热点的形成
2020 年 4 月 28 日，王海峰，GALAH 巡天 和 Gaia 二期星表：连接银河系运动学中的桥梁，拱门和推动浪潮
2020 年 05 月 12 日，方圆，用 Gaia 二期数据来修正人马座流中球状星团的成员星和候选体
2020 年 05 月 19 日，Wasim，冷的天体物理环境中尘埃颗粒的冰覆盖
2020 年 06 月 16 日，陈丙秋，从猎户座星云星团中寻找逃逸的物体
2020 年 06 月 23 日，夏莼，太阳爆发的起始状态和早期运动演化
2020 年 06 月 30 日，刘项琨，暗物质晕形成历史与三轴形状的关系
2020 年 07 月 07 日，孙晓辉，对与超新星遗迹 G57.2+0.8 相关的磁星 SGR 1935+2154 的射电连续谱和极化研究
2020 年 09 月 08 日，黄样，两个贫金属球状星团 M53（NGC 5024）和 NGC 5053 的外部潮汐作用恒星和化学丰度特性
2020 年 09 月 15 日，杨元培，快速射电爆的起源及相关的持续辐射
2020 年 09 月 22 日，李广兴，狭义相对论和广义相对论历史
2020 年 09 月 29 日，李昌鸿，宇宙时钟简介

March 12, 2019, Xun Shi, The Universe at Extreme Magnification
March 19, 2019, Xiangkun Liu, Gravity tests from the combination of lensing and redshift-space distortion
March 26, 2019, Yang Huang, What happened in the inner halo?
April 16, 2019, Yuan Fang, STREAMFINDER I: A New Algorithm for detecting Stellar Streams
April 23, 2019, Dezi Liu, The common sense in question: AGN variabilities
May 14, 2019, Haifeng, Wang, Galactoseismology progress with recent two papers review: Outer disk Asymmetry and Halo accretion
October 15, 2019, Yuanpei Yang, Cosmology with Gravitational Waves Standard Sirens
October 29, 2019, Xiangkun Liu, Ellipticity of Brightest Cluster Galaxies as tracer of halo orientation and weak-lensing mass bias
November 12, 2019, Dezi Liu, Lensed quasar search via time variability with the HSC transient survey
November 19, 2019, Haifeng Wang, The galaxy size distribution of 16 years ago in SDSS
December 06, 2019, Yuan Fang, Phase-space correlation in stellar streams of the Milky Way halo: The clash of Kshir and GD-1
December 10, 2019, Xinzhong, Er, The Sloan Digital Sky Survey-II Supernova Survey: Technical Summary
December 24, 2019, Chun Xia, Generation of solar spicules and subsequent atmospheric heating
December 31, 2019, Bingqiu Chen, The CFIS: Reconstruction the Milky Way Star Formation History from its white dwarf population

March 16, 2020, Yang Huang, Detection of Strong Epicyclic Density Spikes in the GD-1 Stellar Stream, An Absence of Evidence for the Influence of Dark Matter Subhalos?
March 31, 2020, Guangxing Li, A Galactic-scale gas wave in the Solar Neighborhood
March 24, 2020, Yunapei Yang, Fast radio bursts as strong waves interacting with ambient medium
April 07, 2020, Hayato, Constraining the nature of ultra light dark matter particles with the 21 cm forest
April 14, 2020, Chandra, Magnetic reconnection and hot-spot formation in black-hole accretion disks
April 28, 2020, Haifeng Wang, The GALAH survey and Gaia DR2: Linking ridges, arches andvertical waves in the kinematics of the Milky Way
May 12, 2020, Yuan Fang, Globular Clusters in the Sagittarius stream Revising members and candidates with Gaia DR2
May 19, 2020, Wasim, Ice coverage of dust grains in cold astrophysical environments
June 16, 2020, Bingqiu Chen, Hunting for Runaways from the Orion Nebula Cluster
June 23, 2020, Chun Xia, Initiation and Early Kinematic Evolution of Solar Eruptions
June 30, 2020, Xiangkun Liu, Correlations between Triaxial Shapes and Formation History of Dark Matter Halos
July 07, 2020, Xiaohui Sun, A Radio Continuum and Polarization Study of SNR G57.2+0.8 Associated with Magnetar SGR 1935+2154
September 08, 2020, Yang Huang, Extra-Tidal Stars and Checmical Abundance Properties of Two Metal-poor Globular Clusters M53 (NGC 5024) and NGC 5053
September 15, 2020，Yuanpei Yang, FRB origin and associated persistent emission
September 22, 2020，Guangxing Li, History of special and general relativities
September 29, 2020, Changhong Li, A brief introduction to cosmic clock

- 研究生文献研讨会 Postgraduate Journal Club

2020 年 03 月 19 日，张伦纬，三个在红移 1.5 的被尘埃覆盖的恒星形成星系：主序阶段的并和及星系盘
2020 年 03 月 19 日，何紫朝，星系自转和初始条件相关性的观测检验
2020 年 03 月 26 日，孙宝坤，长周期造父变星定标源 SV Vul 的星团成员
2020 年 03 月 26 日，李梓炜，活动星系核中的恒星级黑洞并和率的宇宙学演化
2020 年 04 月 02 日，邓文强，卡耐基超新星项目-II：一个通过测光认证极端 Ia 型超新星的新方法
2020 年 04 月 02 日，李新意，银心的化学丰度细节：富金属 alpha 增丰星族的证据
2020 年 04 月 09 日，刘赟，有质量的中微子在星系自转翻转现象中的作用
2020 年 04 月 16 日，孙伟祥，球状星团 NGC6652 的年龄和化学组成
2020 年 04 月 16 日，徐竹，从高能宇宙中微子中得到对格拉肖共振的新限制
2020 年 04 月 16 日，徐竹，从高能宇宙中微子中得到对格拉肖共振的新限制
2020 年 04 月 23 日，郭贺龙，ALMA 对于中心分子带中的大质量云的观测：金斯碎裂和成团
2020 年 04 月 23 日，王涛，半人马座 ω（NGC5139）中的贫金属星
2020 年 04 月 23 日，刘云龙，PAU 巡天：利用迁移学习得从模拟数据中得到测光红移
2020 年 04 月 30 日，张天宇，宇宙微博背景辐射透镜和重子声波震荡测量间的哈勃常数差异
2020 年 04 月 30 日，沈涵，分辨近邻的尘埃云
2020 年 05 月 07 日，周元，碰撞流导致的年轻大质量星团形成
2020 年 05 月 07 日，赵安，延展宇宙结构的空间关联性
2020 年 05 月 14 日，周吉璇，来自系外行星的微透镜射电发射

2020 年 05 月 14 日，芮冠华，利用产生于原初曲率扰动的随机引力波背景作为探测原初黑洞的探针的前景
2020 年 05 月 21 日，张一纬，测量宇宙的膨胀
2020 年 05 月 28 日，冯鑫铭，利用引力波推断并和中子星的最大及最小质量
2020 年 05 月 28 日，宋哲武，碳星作为标准烛光-I. 麦哲伦星云中的碳星光度函数
2020 年 06 月 04 日，李梓炜，使用 8 个强透镜类星体检验超大质量黑洞和其宿主星系的共同演化关系
2020 年 06 月 04 日，杨勇，在 Gaia 第二次数据释放和郭守敬望远镜数据中的主序拐点星和 OB 星中发现斜脊模式的演化
2020 年 06 月 11 日，李新意，VMC 巡天-XXXVIII. 麦哲伦桥中的恒星自行
2020 年 06 月 11 日，郭贺龙，麦哲伦星云中的红团簇星的颜色-金属丰度关系及红化
2020 年 06 月 18 日，孙伟祥，一个巨大的混乱：当一个大的矮星系和一个类银河星系并和
2020 年 06 月 18 日，刘赟，在冷的自相互作用暗物质模型中模拟“隐藏的巨物”
2020 年 07 月 09 日，孙宝坤，快过程联盟：银晕中的快过程增强恒星搜寻的第四次数据释放
2020 年 07 月 09 日，徐竹，稍早的复合过程作为哈勃常数差异的解决方案
2020 年 09 月 18 日，张伦纬，麦哲伦云冕以及麦哲伦云星流的形成
2020 年 10 月 09 日，李梓炜，系外行星作为新的亚 GeV 暗物质探测器
2020 年 10 月 09 日，郭贺龙，WISE J044232.92+322734.9：位于银河系尘埃团投影方向上的一个红移为 1.1 的恒星形成星系？
2020 年 10 月 16 日，刘赟，利用 Ia 型超新星限制暗能量时本动速度的影响
2020 年 10 月 16 日，李新意，球状星团 ESO 456-SC38 核球区域的光谱分析

March 19, 2020, Lunwei Zhang, Three dusty star forming galaxies at z~1.5: mergers and disks on the main sequence
March 19, 2020, Zizhao He, Observational detection of correlation between galaxy spins and initial conditions
March 26, 2020, Baokun Sun, Cluster membership for the long period Cepheid calibrator SV Vul
March 26, 2020, Ziwei Li, Cosmic Evolution of Stellar-mass Black Hole Merger Rate in Active Galactic Nuclei
April 02, 2020, Wenqiang Deng, Carnegie Supernova Project-II: A new method to photometrically identify sub-types of extreme Type Ia Supernovae
April 02, 2020, Xinyi Li, Detailed abundances in the Galactic center: Evidence of a metal-rich alpha-enhanced stellar population
April 09 2020, Yun Liu, The effect of massive neutrinos on the galaxy spin flip phenomenon
April 16, Weixiang Sun, Age and chemical composition of the globular cluster NGC 6652
April 16, Zhu Xu, New limits on neutrino decay from the Glashow resonance of high-energy cosmic neutrinos
April 23, 2020, Helong Guo, ALMA Observations of Massive Clouds in the Central Molecular Zone: Jeans Fragmentation and Cluster
April 23, 2020, Tao Wang, The Most Metal-poor Stars in Omega Centauri (NGC 5139)
April 23, 2020, The PAU Survey: Photometric redshifts using transfer learning from simulations
April 30, 2020, Tianyu Zhang, Hubble constant tension between CMB lensing and BAO measurements
April 30, 2020, Han Shen, Resolving nearby dust clouds
May 07, 2020, Yuan Zhou, The formation of young massive clusters by colliding flows
May 07, 2020, An Zhao, Spatial correlations of extended cosmological structures
May 14, 2020, Jixuan Zhou, Microlensed Radio Emission from Exoplanets

May 14, 2020, Guanhua Rui, Prospects for probing ultralight primordial black holes using the stochastic gravitational-wave background induced by primordial curvature perturbations
May 21, 2020, Yiwei Zhang, Measuring the expansion of the universe
May 28, 2020, Xinming Feng, Inferring the maximum and minimum mass of merging neutron stars with gravitational waves
May 28, 2020, Zhewu Song, Carbon stars as standard candles - I. The luminosity function of carbon stars in the Magellanic Clouds
June, 04, 2020, Ziwei Li, Testing the Evolution of the Correlations between Supermassive Black Holes and their Host Galaxies using Eight Strongly Lensed Quasars
June 04, 2020, Yong Yang, On the evolution of Diagonal Ridge pattern found in Gaia DR2 with LAMOST Main-Sequence-Turn-Off and OB type Stars
June 11, 2020, Xinyi Li, The VMC survey – XXXVIII. Proper motion of the Magellanic Bridge
June 11, 2020, Helong Guo, On the Color-Metallicity Relation of the Red Clump and the Reddening Toward the Magellanic Clouds
June 18, 2020, Yun Liu, Simulating the "hidden giant" in cold and self-interacting dark matter models
June 18, 2020, Weixiang Sun, A massive mess: When a large dwarf and a Milky Way-like galaxy merge
July, 09, 2020, Baokun Sun, The R-Process Alliance: Fourth Data Release from the Search for r-Process-Enhanced Stars in the Galactic Halo
July 09, 2020, Zhu Xu, Early recombination as a solution to the H0 tension
September 18, 2020, Lunwei Zhang, The Magellanic Corona and the formation of the Magellanic Stream
October 09, 2020, Ziwei Li, Exoplanets as New Sub-GeV Dark Matter Detectors
October 09, 2020, Helog Guo, WISE J044232.92+322734.9: A star-forming galaxy at redshift 1.1 seen through a Galactic dust clump?
October 16, 2020, Yun Liu, Specifific Effffect of Peculiar Velocities on Dark-Energy Constraints from Type Ia Supernovae
October 16, 2020, Xinyi Li, Spectroscopic analysis of the bulge Globular Cluster ESO 456-SC38

七、 SWIFAR 大家庭 The SWIFAR Family

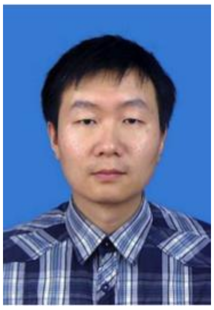
教师 Faculty

刘晓为：教授、所长
Xiaowei LIU: Professor, Director

研究领域：大视场天文学、分光、银河系考古学和近场宇宙学、星际介质、原子和分子过程、辐射机制。
Research interests: Wide-field Astronomy, Spectroscopy, Galactic Archeology and Near-field Cosmology, Interstellar Medium, Atomic and Molecular Processes, Radiation Mechanisms.

范祖辉：教授
Zuhui FAN: Professor

研究领域：宇宙学、大尺度结构、星系动力学。
Research Interests: Cosmology, Large-scale Structures, Galactic Dynamics.

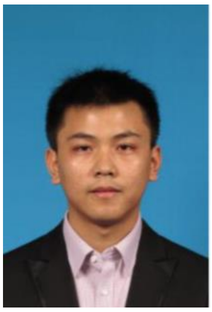


尔欣中：教授
Xinzhong ER: Professor

研究领域：引力透镜理论及其应用、星系、星系团及宇宙学。
Research Interests: Gravitational Lensing Theory and its Application, Galaxy, Cluster and Cosmology.

陈丙秋：副教授
Bingqiu CHEN: Associate Professor

研究领域：银河系三维消光、尘埃、星际介质、银河系结构、变星、测光/光谱巡天。
Research Interests: Three-dimensional Extinction Maps, Dust, ISM, Structure of the Milky Way, Pulsators (like RR Lyrae Stars), Photometric/Spectroscopic Surveys.



黄样：副教授、副所长
Yang HUANG: Associate Professor, Associate Director

研究领域：大规模光谱巡天、星系动力学、星族、恒星物理、活动星系核。
Research Interests: Large-scale Spectroscopic Survey, Galactic Dynamics, Stellar Populations, Stellar Physics, AGN.

刘项琨：副教授、副所长
Xiangkun LIU: Associate Professor, Associate Director

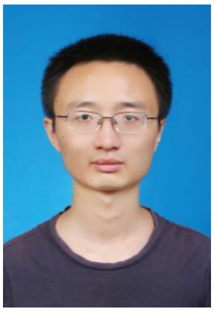
研究领域：宇宙学、弱引力透镜、大尺度结构、数值模拟。
Research Interests: Cosmology, Weak Gravitational Lensing, Large-Scale Structure, Numerical Simulations.

石洵：副教授
Xun SHI: Associate Professor

研究领域：星系团内介质、星系团、天体流体力学、大尺度结构。
Research Interests: Intracluster Medium, Galaxy Clusters, Astrophysical Fluid Dynamics, Large-Scale Structure.

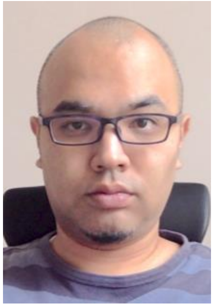
李广兴：副教授
Guangxing LI: Associate Professor

研究领域：星际介质、恒星形成、天体物理中的气体动力学过程。
Research Interests: Interstellar Medium, Star Formation, Gas Dynamics in Astrophysics.



杨元培：助理教授
Yuanpei YANG: Assistant Professor

研究领域：快速射电暴、天体物理方法对基础物理的限制、高能天体物理、辐射机制。
Research Interests: Fast Radio Bursts, Astrophysical Probes of Fundamental Physics, High-Energy Astrophysics, Radiation Mechanism.



島袋隼士：助理教授
Hayato Shimabukuro: Assistant Professor

研究领域：宇宙学、再电离时期、21 厘米宇宙学、机器学习。
Research Interests: Cosmology, Epoch of Reionization, 21cm Cosmology, Machine Learning.

钱德拉·巴哈杜尔·辛格：助理教授
Chandra Bahadur Singh: Assistant Professor

研究领域：利用半解析和数值的方法回答物质如何回落进黑洞并产生宇宙中能量最高的外流（高能天体物理、黑洞吸积和抛射现象、相对论流体动力学）。
Research Interests: Answer basic questions of how matter falls onto the black holes and produce the most energetic outflows in the known universe using semi-analytical and numerical approach (High Energy Astrophysics, Black Hole Accretion-Ejection Phenomena, Relativistic Fluid Dynamics).

博士后 Postdoctoral Research Fellows

刘德子 Dezi LIU

研究领域：弱引力透镜信号测量及系统误差分析、数字巡天图像模拟、多波段测光红移分析、基于引力透镜的星系及星系团物理性质研究等。
Research Interests: Weak Lensing shear measurement and systematic analyses, image simulation, photometric redshift measurement, galaxy and cluster studies through gravitational lensing.

王海峰 Haifeng WANG

研究领域：银河系化学动力学结构、近场宇宙学、天文大数据处理与分析等
Research Interests: Chemo-Dynamical Structures of the Milky Way, Near-Field Cosmology, Astronomical big data reduction and analysis, and etc.

方圆 Yuan FANG

研究领域：空间数据挖掘。
Research Interests: Spatial Data Mining.

瓦西姆·伊克巴尔 Wasim IQBAL

研究领域：各种天体物理环境中复杂分子的形成和演化过程。
Research Interests: Formation and evolution of complex molecules in various astrophysical sources.

杨蕾 Lei YANG

研究领域：星系两点相关函数、星系形成和演化、星系-暗晕关联模型、宇宙大尺度结构等。
Research interests: Galaxy two-point correlation function, galaxy formation and evolution, galaxy-halo connection, the large-scale structures of the Universe.

行政管理人员 Administration Staff

郭晓明，子昭瑾，胡玥

Xiaoming GUO, Zhaojin ZI, Yue HU

博士研究生 PhD Students

2017 级：杨勇

2019 级：张伦纬

2020 级：郭贺龙，李新意，李梓炜，孙伟祥

Grade 2017: Yong YANG

Grade 2019: Lunwei ZHANG

Grade 2020: Helong GUO, Xinyi LI, Ziwei LI, Weixiang SUN

硕士研究生 Master Students

2018 级：刘赟，刘云龙，孙宝坤，王涛，徐竹

2019 级：冯薪铭，芮冠华，沈涵，宋哲武，张天宇，赵安，张一纬，周吉璇，周元

2020 级：陈鑫磊，何秋忆，黄俊翔，蒋琪琪，李孟宇，凌文凯，刘权宇，刘玉豪，石瑞峰，文静

Grade 2018: Yun LIU, Yunlong LIU, Baokun SUN, Tao WANG, Zhu XU

Grade 2019: Xinming FENG, Guanhua RUI, Han SHEN, Zhewu SONG, Tianyu ZHANG, An ZHAO, Yiwei ZHANG, Jixuan ZHOU, Yuan ZHOU

Grade 2020: Xinlei CHEN, Qiuyi HE, Junxiang HUANG, Qiqi JIANG, Mengyu LI, Wenkai LING, Quanyu LIU, Yuhao LIU, Ruifeng SHI, Jing WEN

图 7.1: 研究所 2020 迎新及双节联欢晚会照片集锦 Photos taken at the 2020 SWIFAR Mid-Autumn Party

图 7.2: 人事处主办、研究所承办的云南大学首届青年学术沙龙 The 1st Youth Academic Salon of Yunnan University organised by the HR Dept of YNU. Local support provided by SWIFAR