Yan-Rong LI (李彦荣)

PERSONAL INFORMATION

Year of Birth	1985	**Place of Birth**	Gansu Province, China (中国甘肃)
Nationality	Chinese	**Gender**	Male
Marital Status	Married	**Tel**	+86 (010) 8823 6713

Address Key Laboratory for Particle Astrophysics
Institute of High Energy Physics
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EDUCATION

2006—2011	Ph.D in Astrophysics Institute of High Energy Physics, China Thesis: *Spins of Supermassive Black Holes in Galactic Centers*
2002—2006	Bachelor degree in Theoretical and Applied Mechanics Peking University, China

POSITIONS

Jan, 2020—present	Staff researcher Institute of High Energy Physics
Jan, 2014—Dec, 2019	Staff associate researcher Institute of High Energy Physics
Jul, 2011—Dec, 2013	Staff assistant researcher Institute of High Energy Physics

MEMBERSHIP

2019—2022	The Youth Innovation Promotion Association, Chinese Academy of Sciences

AWARDS

2011	Outstanding Graduate Student Award of Chinese Academy of Sciences
2011	Chinese Academy of Sciences Dean Excellent Reward
2024	Outstanding Member of the Youth Innovation Promotion Association, Chinese Academy of Sciences

CURRENT RESEARCH INTERESTS

- Active galactic nuclei
- Mass and spin of supermassive black holes
- Broad-line regions
- Accretion processes
- Supermassive black hole binaries

TECHNICAL SKILLS

- Scientific programming using C/C++, FORTRAN, Python, IDL, MATLAB, and R language
- High-performance parallel scientific computation using MPICH and OpenMP

OBSERVATION PROPOSALS

- 2015, Lijiang 2.4m, Optical spectroscopy, 60 nights, Co-I
  Reverberation Mapping Monitoring of AGNs
- 2022A, IRTF 3m, Infrared spectroscopy, 16 nights, Co-I
  Infrared Spectroscopic Reverberation Mapping of Two GRAVITY/VLTI-targeted AGNs
- 2022B, IRTF 3m, Infrared spectroscopy, 13 nights, Co-I
  Infrared Spectroscopic Reverberation Mapping of the GRAVITY/VLTI-targeted AGN Ark 120
- 2024A, IRTF 3m, Infrared spectroscopy, 17 nights, Co-PI
  Infrared Spectroscopic Reverberation Mapping of a GRAVITY/VLTI-targeted Active Galactic Nucleus

GRANTS & FUNDING

- NSFC Youth Grant, **PI**, ¥280,000: "Spins of Supermassive Black Holes and Their Cosmological Evolution", 2014-2016
- NSFC General Program, **PI**, ¥700,000: "Mass Measurement of Supermassive Black Holes", 2016-2019
- Membership Grant of the Youth Innovation Promotion Association, **PI**, ¥800,000: "Supermassive Black Holes", 2019-2022
- NSFC Grant for Outstanding Young Scholars (No.11922304), **PI**, ¥1,200,000: "Supermassive Black Holes in Active Galactic Nuclei", 2020-2022
- NSFC General Program, **PI**, ¥550,000: "Accretion and Variability of Close Binaries of Supermassive Black Holes", 2023-2026
- Outstanding Membership Grant of the Youth Innovation Promotion Association, **PI**, ¥2,000,000: "Supermassive Black Hole Astrophysics", 2024-2026
- China-Chile Joint Research Found 2023, **PI**, "A NIR Spectroscopic Study of Nearby Bright AGN Backup Targets for GRAVITY+/VLTI Interferometry"

SOFTWARE

- `PyAT`—a package providing useful tools for astronomical analysis
  `https://github.com/LiyrAstroph/PyAT`
- `PyCALI`—a Bayesian method for the inter-calibration of spectra in reverberation mapping
  `https://github.com/LiyrAstroph/PyCALI`
- `BRAINS`—dynamical modeling for broad-line regions in active galactic nuclei
  `https://github.com/LiyrAstroph/BRAINS`
- `MICA`—a reverberation-mapping analysis package
  `https://github.com/LiyrAstroph/MICA2`
- `PIXON`—a pixon-based reverberation mapping analysis
  `https://github.com/LiyrAstroph/PIXON`

- `CDNest`—an MPI-based diffusive nested sampling package in C
  `https://github.com/LiyrAstroph/CDNest`
- `RECON`—measures power spectra and reconstructs time series in active galactic nuclei
  `https://github.com/LiyrAstroph/RECON`
- `CyPDM`—a fast package to apply the phase disperion minimization (PDM) algorithm
  `https://github.com/LiyrAstroph/CyPDM`
- `Spartan`—a code to calculate the structure and emergent spectrum of ADAFs
  `https://github.com/LiyrAstroph/Spartan`

INVITED TALKS AND COLLIQUIA

- Gravitational Lensing 2024 Workshop, Sep. 27, 2024
  Reverberation Mapping and Gravitational Lensing
- Colliquium, Huazhong University of Science and Technology, Mar. 9, 2022
  Black Hole Mass Measurements in Active Galactic Nuclei
- Colliquium, Xiamen University, Nov. 4, 2021
  Black Hole Mass Measurements in Active Galactic Nuclei
- Mapping Central Regions of Active Galactic Nuclei, Guilin, China, Oct. 19-24, 2019
  BLR Dynamical Modeling in Active Galactic Nuclei
- AGN Reverberation Mapping: the pc-Scale Garden of Massive Black Holes, Lijiang, China, Oct. 24-26, 2016
  BLR Dynamical Modeling and Black-Hole Mass Measurements of AGNs

CONTRIBUTED TALKS

- The 6th Galileo-Xu Guangqi Meeting, Hengyang, China, Apr. 19-24, 2024
  Talk: *Measuring Geometric Distances of Quasars through GRAVITY/VLTI*
- Multi-wavelength Studies of AGN and Quasars, Lijiang, China, Jul. 20-23, 2023
  Talk: *Spectroastrometric Reverberation Mapping of Broad-line Regions and Black Hole Mass Measurements*
- Time-domain Gravitational Lensing Workshop, Nanjing, China, Apr. 15-16, 2023
  Talk: *Reverberation Mapping of Broad-line Regions and Accretion Disks in Active Galactic Nuclei*
- Serbian-Chinese Astronomical Scientific Meeting: Physics and Nature of Active Galactic Nuclei, Belgrade, Serbia, Apr. 16-19, 2018
  Talk: *Testing Periodic Signals in Red-Noise Time Series of Active Galactic Nuclei*
- USTC Symposium on "Accretion on all scales", Hefei, China, Jan. 14-16, 2017
  Talk: *Black-Hole Mass Measurement and Supermassive Black Hole Binaries*
- East-Asia AGN Wrorkshop 2016, Seoul, Korea, Sep. 22-24, 2016
  Talk: *Spectroscopic Indication of a Centi-parsec Supermassive Black Hole Binary in the Galactic Center of NGC 5548*
- USTC Symposium on "SMBH and Galaxies", Hefei, China, Jul. 26-27, 2015
  Talk: *Spins of Supermassive Black Holes and Lifetimes of AGNs*
- AGN Reverberation: Present & Future, Oct 23-25, 2013
  Talk: *A Bayesian Approach to Estimate the Size and Structure of the BLR In AGNs Using Reverberation Mapping Data*

- Workshop on Accretion Disks, KIAA, Peking University, Nov 23-30, 2008
  Talk: *Spins of Supermassive Black Holes: Constraints from TeV Observations*

PEER REVIEW SERVICES

- Referee for ApJ, ApJL, MNRAS, PASJ, Frontiers, RAA, and Chinese Physics C
- Grant reviewer for NSF of China

PUBLICATIONS (ADS Link)

Papers submitted.

1. **Li, Y.-R.**, et al. **2025**, ApJ submitted (arXiv:2502.18856)
   Spectroastrometry and Reverberation Mapping of Active Galactic Nuclei. II. Measuring Geometric Distances and Black Hole Masses of Four Nearby Quasars

Refereed papers, first-author/corresponding-author(*).

23. **Li, Y.-R.** & Wang, J.-M. **2025**, ApJ, 979, 126
    Radial-dependent Responsivity of Broad-line Regions in Active Galactic Nuclei: Observational Consequences for Reverberation Mapping and Black Hole Mass Measurements
22. **Li, Y.-R.**, Hu, C., Yao, Z.-H., et al. **2024**, ApJ, 974, 86
    Spectroastrometry and Reverberation Mapping of Active Galactic Nuclei. I. The Hβ Broad-line Region Structure and Black Hole Masses of Five Quasars
21. Chen, Y.-J., Zhai, S., Liu, J.-R., Guo, W.-J., Peng, Y.-C., **Li, Y.-R.***, Songsheng, Y.-Y., Du, P., Hu, C., Wang, J.-M.*, **2024**, MNRAS, 527, 12154
    Searching for Quasar candidates with Periodic Variations from the Zwicky Transient Facility: Results and Implications
20. Chen, Y.-J., Zhai, S., Liu, J.-R., Yao, Z.-H., **Li, Y.-R.***, Du, P., Hu, C., Guo, W.-J., Lu, K.-X., Xiao, M., Songsheng, Y.-Y., Wang, J.-M.*, **2023**, MNRAS, 522, 3439
    Mid-infrared Dusty Torus Sizes in Active Galactic Nuclei with Hβ Reverberation Mapping
19. Chen, Y.-J., Bao, D.-W., Zhai, S., Fang, F.-N., Hu, C.*, Du, P., Yang, S., Yao, Z.-H., **Li, Y.-R.***, Brotherton, M. S., McLane, J. N., Zastrocky, T. E., ..., Wang, J.-M.*, **2023**, MNRAS, 520, 1807
    Broad-line Region in NGC 4151 Monitored by Two Decades of Reverberation Mapping Campaigns. I. Evolution of Structure and Kinematics
18. **Li, Y.-R.** & Wang, J.-M., **2023**, ApJ, 943, 36
    Spectroastrometric Reverberation Mapping of Broad-line Regions
17. Guo, W.-J., **Li, Y.-R.***, Zhang, Z.-X., Ho, L. C. & Wang, J.-M.* **2022**, ApJ, 929, 19
    Accretion Disk Size Measurements of Active Galactic Nuclei Monitored by the Zwicky Transient Facility
16. **Li, Y.-R.**, et al., **2022**, ApJ, 927, 58
    Spectroastrometry and Reverberation Mapping: the Mass and Geometric Distance of the Supermassive Black Hole in the Quasar 3C 273
15. **Li, Y.-R.**, et al., **2021**, ApJ, 921, 151
    A Pixon-Based Method for Reverberation-Mapping Analysis in Active Galactic Nuclei
14. **Li, Y.-R.**, et al., **2020**, ApJ, 897, 18
    Untangling Optical Emissions of the Jet and Accretion Disk in the Flat-Spectrum Radio Quasar 3C 273 with Reverberation Mapping Data

13. **Li, Y.-R.**, et al., **2019**, ApJS, 241, 33
A Possible ∼20 yr Periodicity in Long-term Variations of the Nearby Radio-Quiet Active Galactic Nucleus Ark 120

12. **Li, Y.-R.**, et al., **2018**, ApJ, 869, 137
Supermassive Black Holes with High Accretion Rates in Active Galactic Nuclei. VIII. Structure of the Broad-Line Region and Mass of the Central Black Hole in Mrk 142

11. **Li, Y.-R.**, & Wang, J.-M., **2018**, MNRAS, 476, L55
A New Approach for Measuring Power Spectra and Reconstructing Time Series in Active Galactic Nuclei

10. **Li, Y.-R.**, Wang, J.-M., & Bai, J.-M., **2016**, ApJ, 831, 206
A Non-parametric Approach to Constrain the Transfer Function in Reverberation Mapping

9. **Li, Y.-R.**, Wang, J.-M., Ho, L. C. et al., **2016**, ApJ, 822, 4
Spectroscopic Indication of a Centi-parsec Supermassive Black Hole Binary in the Galactic Center of NGC 5548

8. **Li, Y.-R.**, Wang, J.-M., Cheng, C. & Qiu, J., **2015**, ApJ, 804, 45
Alignments of Black Holes with Their Warped Accretion Disks and Episodic Lifetimes of Active Galactic Nuclei

7. **Li, Y.-R.**, Wang, J.-M., Hu, C., Du, P. & Bai, J.-M., **2014**, ApJL, 786, L6
A Bayesian Method for the Intercalibration of Spectra In Reverberation Mapping

6. **Li, Y.-R.**, Wang, J.-M., Ho, L. C., Du, P. & Bai, J.-M., **2013**, ApJ, 779, 110
A Bayesian Approach to Estimate the Size and Structure of the Broad Line Region In Active Galactic Nuclei Using Reverberation Mapping Data

5. **Li, Y.-R.**, Wang, J.-M., Cheng, C. & Qiu, J., **2013**, ApJ, 764, 16
Evolution of Warped Accretion Disks in Active Galactic Nuclei. I. Roles of Feeding at the Outer Boundaries.

4. **Li, Y.-R.**, Wang, J.-M. & Ho, L. C., **2012**, ApJ, 749, 187
Cosmological Evolution of Supermassive Black Holes. II. Evidence for Downsizing of Spin Evolution.

3. **Li, Y.-R.**, Ho, L. C. & Wang, J.-M., **2011**, ApJ, 742, 33
Cosmological Evolution of Supermassive Black Holes. I. Mass Function at $0 < z \lesssim 2$.

2. **Li, Y.-R.**, Wang, J.-M., Yuan, Y.-F., Hu, C. & Zhang, S., **2010**, ApJ, 710, 878
Episodic Activities of Supermassive Black Holes at Redshift $z \lesssim 2$*: Driven by Mergers?*

1. **Li, Y.-R.**; Yuan, Y.-F., Wang, J.-M., Wang, J.-C. & Zhang, S., **2009**, ApJ, 699, 513
Spins of Supermassive Black Holes in M87. II. Fully General Relativistic Calculations.

Selected refereed papers, co-authoring.

- Kara, E. et al. (including **Li, Y.-R.**), **2021**, ApJ, 922, 151
AGN STORM 2: I. First results: A Change in the Weather of Mrk 817

- Cackett, E. M., Gelbord, J., **Li, Y.-R.**, et al., **2020**, ApJ, 896, 1
Supermassive Black Holes with High Accretion Rates in Active Galactic Nuclei. XI. Accretion Disk Reverberation Mapping of Mrk 142

- Hu, C., **Li, Y.-R.**, et al. **2020**, ApJ, 890, 71
Broad-line Region of the Quasar PG 2130+099 from a Two-Year Reverberation Mapping Campaign with High Cadence

- Czerny, B., **Li, Y.-R.**, et al. **2017**, ApJ, 846, 154
  Failed Radiatively Accelerated Dusty Outflow Model of the Broad Line Region in Active Galactic Nuclei. I. Analytical Solution

- Wang, J.-M., **Li, Y.-R.**, Wang, J.-C. & Zhang, S., **2008**, ApJL, 676, 109
  Spins of the Supermassive Black Hole in M87: New Constraints from TeV Observations.