Yuexin Zhang

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EDUCATION

Department of Physics, Fudan University, Shanghai, China Expected June 2019

B.S. Candidate in Physics

› Overall GPA: 3.48/4.00; Major GPA: 3.61/4.00

Hamburg University, Hamburg, Germany Jul 2018

› Relevant Coursework: General Relativity, Quantum Field Theory, Particles, String Theory, and Cosmology

RESEARCH EXPERIENCE

Research Assistant in the Center for Field Theory and Particle Physics, Department of Physics, Fudan University

Advisor: **Cosimo Bambi**, Department of Physics, Fudan University

Testing the Kerr Metric with X-ray Spectroscopy of GRS 1915+105 May 2018–Feb 2019

› Performed spectral fits on *NuSTAR* and *Suzaku* observation data of GRS 1915+105 (XRB) to obtain best fit with advanced relativistic reflection model which takes the Johannsen metric into consideration

› Identified degeneracy of spin and deformation parameters in the Johannsen metric to test General Relativity

Black Holes in Alternative Theories of Gravity Mar 2018–May 2018

› Simulated iron K_α line in the reflection spectrum of accretion disks around black holes in asymptotically safe gravity

› Demonstrated the current X-ray facilities cannot distinguish black holes in safe gravity from those in Einstein's gravity

Studying GX 339–4 for Testing the Kerr Metric with Present and Future X-ray Missions Jun 2017–Jan 2018

› Utilized *NuSTAR*, *eXTP*, and *Athena* to simulate X-ray spectra of GX 339–4 (XRB) based on the reflection model

› Performed spectral fits to testify that a relativistic reflection model in the Johannsen metric is reliable

› Established with contour plots that *eXTP* and *Athena* more strongly constrain deformation parameters than *NuSTAR*

Advisors: **Cosimo Bambi**, Department of Physics, Fudan University; **Matteo Guainazzi**, European Space Agency

Measuring the Spin of MCG–6-30-15 with X-ray Spectroscopy Feb 2018

› Reduced simultaneous *XMM-Newton* and *NuSTAR* observation data of MCG–6-30-15 (AGN)

› Applied the iron line method: a relativistic neutral Compton reflection model with self-consistent Fe and Ni lines, and a reflection model with relativistic broadening separately to measure the spin of MCG–6-30-15

› Found that the spin measurements are consistent. Confirmed the gravitational effects on the iron line shape

PUBLICATIONS

[1] **Zhang, Y.**, Abdikamalov, A., Ayzenberg, D., Bambi, C., Dauser, T., García, J., and Nampalliwar, S. (2019). About the Kerr nature of the stellar-mass black hole in GRS 1915+105, *The Astrophysical Journal*, 875 (1), 41.

[2] **Zhang, Y.**, Zhou, M., and Bambi, C. (2018). Iron line spectroscopy of black holes in asymptotically safe gravity. *The European Physical Journal C*, 78 (5), 376.

ACADEMIC ACTIVITIES

❖ Winter School on X-ray Data Analysis, Shanghai, China Jan 2018–Feb 2018

❖ Mini-Workshop on Black Holes, Shanghai, China Nov 2017

❖ Astrophysics Summer School, National Astronomical Observatories, Beijing, China Aug 2017

❖ 2nd Fudan Winter School on Astrophysical Black Holes, Shanghai, China Jan 2017

❖ Fudan Astronomical Society | *Vice President* Feb 2017–Feb 2018

| *Deputy Minister of Academic Affairs* Feb 2016–Feb 2017

› Organized inter-university academic activities on astronomy, and organized astronomical observations monthly

› Gave lectures to amateurs about basic astronomy knowledge

HONORS AND AWARDS

❖ Innovation Scholarship in Academic Science and Technology (**5 out of all undergraduates** in Fudan) 2018

❖ KLA-Tencor Scholarship (**4/101**, and the only one awarded in the Department of Physics) 2018

❖ Honor Student Scholarship in Natural Science (**5/101** in the Department of Physics) 2018

❖ Outstanding Undergraduate Scholarship (top 20% in the Department of Physics) 2017 & 2018

❖ Second Prize, Fudan Undergraduate Scholarship (12/101 in the Department of Physics) 2017

SKILLS

❖ Computer Skills: Advanced—Mathematica, C/C++, LaTeX; Prefficient—Python, Inkscape, COMSOL

❖ X-ray Spectral Analysis Techniques: Data reduction for *NuSTAR* (FPMA & FPMB), *Suzaku* (XIS & HXD/PIN), *XMM-Newton* (EPIC/MOS & pn); Adept in `XSPEC` package