

Junjie Mao

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Research interests and expertise

high-resolution X-ray spectroscopy; circumnuclear medium; interstellar medium; intracluster medium; active galactic nucleus; galaxy cluster; atomic codes and databases

Employment and research

- 2018–Now STFC-funded research associate at University of Strathclyde (UK)
Theoretical and computational research in atomic processes for astrophysical plasmas (PI: Prof. Nigel R. Badnell)
- 2018 ESA-funded research project (€ 26k) at SRON (Netherlands)
CIELO-RGS: The first catalogue of high-resolution X-ray emission lines (PI: Dr. Matteo Guainazzi)

Education

- 2014–2018 Ph.D. in astrophysics (supervisors: Prof. Jelle S. Kaastra & Dr. Jelle de Plaa)
SRON Netherlands Institute for Space Research
Leiden Observatory, Leiden University
Astrophysical plasma modeling of the hot Universe: Advances and challenges from high-resolution X-ray spectroscopy (Ph.D. thesis title)
- 2011–2014 M.Sc. in astrophysics (supervisor: Prof. Shuang-Nan Zhang)
National Astronomical Observatory, Chinese academy of science (NAOC)
University of Chinese Academy of Science (UCAS)
- 2007–2011 B.Sc. in applied physics (supervisor: Prof. Zhongheng Li)
Zhejiang University of Technology (ZJUT)

Conference and presentation

A full list of presentations is available at the end of this document.

Invited talk: 0

Informal talk: 5

Contributed talk: 4

Poster: 2

Colloquium: 2

Travel grant: €1700 + £540

Selected presentations

1. (contributed talk) *Density diagnostics of ionized outflows in Active Galactic Nuclei*, **HUBS workshop**, Shanghai, China, 2018
2. (contributed talk) *Self-consistent photoionized plasma modeling of NGC 3783 in X-rays*, **AGN winds on the Georgia coast**, Jekyll Island, Georgia, USA, 2017 [LKBF travel support €900]
3. (contributed talk) *Density diagnostics of ionized outflows in Active Galactic Nuclei*, **X-ray Universe**, Rome, Italy, 2017

Professional activity

1. Member of the **UK-APAP** network
2. Member of the **SPEX** team
3. Member of the **HUBS** scientific working groups

Teaching experience

Student co-supervision

2018–2019 M. McArthur & R. Lee (B.Sc, University of Strathclyde, ongoing)

2017–2018 P. Mohanty (M.Sc., Leiden University)

Teaching assistant

2017 High energy astrophysics (Master course, Leiden University)

2015 Observational and theoretical cosmology (Bachelor course, Utrecht University)

Outreach

2018 Nijmegen **Discovery Club (Universe Awareness)**, an afterschool educational programme for children in refugee centres
Netherlands

Publication List

22. **Junjie Mao**, J. de Plaa, J. S. Kaastra, et al. *A&A*, 2019, 621, A99
Photoionized emission and absorption features in the high-resolution X-ray spectra of NGC 3783
21. **Junjie Mao**, Jelle de Plaa, Jelle Kaastra, et al., *A&A*, 2019, 621, A9
Nitrogen abundance in the X-ray halos of clusters and groups of galaxies
20. **Junjie Mao**, J. S. Kaastra, M. Mehdipour et al. *A&A*, 2018, 612, A18
Anatomy of the AGN in NGC 5548 IX. Photoionized emission features in the soft X-ray band
19. **Junjie Mao**, J. S. Kaastra, M. Mehdipour et al., *A&A*, 2017, 607, A100
Density diagnostics of ionized outflows in active galactic nuclei X-ray and UV absorption lines from metastable levels in Be-like to C-like ions
18. **Junjie Mao**, Jelle Kaastra, N. R. Badnell, *A&A*, 2017, 599, A10
The energy loss rate of radiative recombination
17. **Junjie Mao**, Jelle Kaastra, 2016, *A&A*, 2016, 587A, 84M
The level-resolved radiative recombination data for SPEX3
16. **Junjie Mao**, Zhixing Ling, Shuang-Nan Zhang, *ApJ*, 2014, 785, 23
X-ray scattered halo around IGR J17544-2619
15. Liyi Gu, **Junjie Mao**, Jelle de Plaa et al. *A&A*, 2018, 611, A26
Charge exchange in galaxy clusters
14. Liyi Gu, **Junjie Mao**, Christopher P. O’Dea, et al., *A&A*, 2017, 601, A45
Charge exchange in the ultraviolet: implication for interacting clouds in the core of NGC 1275
13. Liyi Gu, **Junjie Mao**, Elisa Constantini, et al., *A&A*, 2016, 594, A78
Suzaku and XMM-Newton observations of the North Polar Spur: Charge exchange or ISM absorption?
12. G. A. Kriss, M. Mehdipour, J. S. Kaastra, et al., *A&A*, 2019, 621, A12
HST/COS observations of the newly discovered obscuring outflow in NGC 3783
11. J. S. Kaastra, M. Mehdipour, E. Behar, et al., *A&A*, 2018, 619, 112
Recurring obscuration in NGC 3783
10. F. Mernier, N. Werner, J. de Plaa, et al., *MNRASL*, 2018, 480, 95
Solar chemical composition in the hot gas of cool-core ellipticals, groups, and clusters of galaxies

9. F. Mernier, J. de Plaa, J. Kaastra et al., MNRASL, 2018, 478, 116
Mass-invariance of the iron enrichment in the hot haloes of massive ellipticals, groups, and clusters of galaxies
8. R. Middei, S. Bianchi, M. Cappi, et al., A&A, 2018, 615, A163
Multi-wavelength campaign on NCG 7469. IV. The broad-band X-ray spectrum
7. M. Mehdipour, J. S. Kaastra, G. A. Kriss, et al. A&A, 2018, 615, A72
Multi-wavelength campaign on NGC 7469 III. Spectral energy distribution and the AGN wind photoionisation modelling, plus detection of diffuse X-rays from the starburst with Chandra HETGS
6. M. Mehdipour, J. S. Kaastra, G. A. Kriss, et al. A&A, 2017, 607, A28
Chasing obscuration in type-I AGN: discovery of an eclipsing clumpy wind at the outer broad-line region of NGC 3783
5. J. S. Kaastra, L. Gu, J. Mao, et al. JINST, 2017, 12, 08
Science with hot astrophysical plasmas
4. F. Mernier, J. de Plaa, J. Kaastra et al., A&A, 2017, A80, 27
Radial metal abundance profiles in the intra-cluster medium of cool-core galaxy clusters, groups, and ellipticals
3. H. Akamatsu, L. Gu, T. W. Shimwell et al., A&A, 2016, 593, L7
Suzaku and XMM-Newton observations of the newly discovered early-stage cluster merger of 1E2216.0-0401 and 1E2215.7-0404
2. F. Mernier, J. de Plaa, C. Pinto et al., A&A, 2016, 592, A157
Origin of central abundances in the hot intra-cluster medium II. Chemical enrichment and supernova yield models
1. F. Mernier, J. de Plaa, C. Pinto et al., A&A, 2016, 592, A157
Origin of central abundances in the hot intra-cluster medium I. Individual and average abundance ratios from XMM-Newton EPIC

Presentation List

13. (informal talk) *CHEERS: Chemical Enrichment Rgs Sample*, Institute of High Energy Physics (IHEP), Beijing, China, 2018
12. (informal talk) *Astrophysical plasma modeling of the hot Universe*, Tsinghua Center for Astrophysics, (THCA), Beijing, China, 2018
11. (informal talk) *Chasing obscuring winds in type-I AGN*, National Astronomical Observatory, Chinese Academy of Science (NAOC), Beijing, China, 2018

10. (contributed talk) *Density diagnostics of ionized outflows in Active Galactic Nuclei*, **HUBS workshop**, Shanghai, China, 2018
9. (colloquium) *Astrophysical plasma modeling of the hot Universe*, Leiden Observatory, Leiden, Netherlands, 2018
8. (colloquium) *Astrophysical plasma modeling of the hot Universe*, SRON, Utrecht, Netherlands, 2018
7. (contributed talk) *Self-consistent photoionized plasma modeling of NGC 3783 in X-rays*, **AGN winds on the Georgia coast**, Jekyll Island, Georgia, USA, 2017 [LKBF travel support € 900]
6. (contributed talk) *Density diagnostics of ionized outflows in Active Galactic Nuclei*, **X-ray Universe**, Rome, Italy, 2017
5. (contributed talk) *Measuring the density of ionized outflows in supermassive black holes*, SRON science day, Soesterberg, Netherlands, 2017
4. (poster) *Parameterisation for the Level Resolved Radiative Recombination Data*, **The Universe in High-resolution X-ray Spectra**, Boston, Massachusetts, USA, 2015 [LKBF travel support € 800]
3. (poster) *Parameterisation for the Level Resolved Radiative Recombination Data*, **Spectroscopy of Cosmic Plasma in the Era of Astro-H**, Tokyo, Japan, 2015
2. (informal talk) *The X-ray scattered halo around IGR J17544-2619*, Guangxi University, Nanning, Guangxi, China, 2014
1. (informal talk) *The X-ray scattered halo around IGR J17544-2619*, National Astronomical Observatory, Chinese Academy of Science (NAOC), Beijing, China, 2014