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K. Aditya

Curriculum Vitae

Date of Birth	29th August 1992
Nationality	Indian

Contact Information

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Employment

- Research Associate - II *(December 2023 - present)*
  Indian Institute of Astrophysics, Bengaluru 560 034, INDIA

- Research Associate - I *(December 2022 - December 2023)*
  Indian Institute of Astrophysics, Bengaluru 560 034, INDIA

- Post Doctoral Researcher *(September 2022 - December 2022)*
  Indian Institute of Astrophysics, Bengaluru 560 034, INDIA

Education

Indian Institute of Science Education and Research, Tirupati, Andhra Pradesh, INDIA
Ph.D., Physics, *(August 2017 - December 2022)*

- *Thesis Topic: "HI 21 cm observations and dynamical models of superthin galaxies"*
- *Supervisor: Dr. Arunima Banerjee*

Jamia Millia Islamia, New Delhi, INDIA
M.Sc. Physics, 2017

University of Delhi, New Delhi, INDIA
B.Sc. (Hons) Physics, 2011

Skills

Galactic Dynamics:

- Modeling galaxies using axisymmetric and spherical Jeans equation.

- Self-consistent equilibrium models of galaxies using AGAMA(Action Angle based Galaxy Modeling Architecture).

- N-body simulations using AREPO, Gadget-2, analysis using pynbody.

HI observations and modeling:

- Radio interferometric data reduction (CASA)
- Modeling the spectral line data cubes using 3D-tilted ring modeling; FAT, TiRiFiC, BBarolo

Statistical Methods:

- Data analysis and application of Bayesian statistics/ MCMC methods to multi-dimensional parameter estimation problems, machine learning methods: Principal Component Analysis (PCA).

Programing:

- Proficient in Python, R, and associated libraries for studying galactic dynamics and data analysis projects.

Talks

- *HI 21 cm observations and dynamical models of superthin galaxies.* ASI meeting (2023) @ IIT, Indore.
- *How cold are superthin galaxies ?* ASI meeting (2020) @ IISER Tirupati.

Posters presentations

- *Dynamics of extremely thin galaxy FGC 1440* @Astronomical Society of India (ASI) meeting (2021) (online).
- *How cold are superthin galaxies ?* Data analysis and machine learning workshop (2019) @ IISER Tirupati.
- *How cold are superthin galaxies ?* Galaxy evolution and Dynamical Structures workshop (2018) @IUCAA Pune.

Workshops attended

- Radio astronomy school (2019) @ NCRA, TIFR, Pune.
- Multi-wavelength Sky Observations - AstroSat and Beyond (2019) @ IIT, Indore.
- Data analysis and machine learning workshop (2019) @ IISER, Tirupati.
- Galaxy evolution and Dynamical Structures workshop (2018) @ IUCAA Pune.
- Cosmological and Theoretical Applications of Exact Solutions of Einstein's Equations (2016) @ Jamia Millia Islamia, New Delhi.
- Probing the Large Scale Structure of the Universe with Weak Lensing (2016) @ Jamia Millia Islamia, New Delhi.

Academic Experience

- Teaching assistant for Data analysis and machine learning workshop (2019) tutorial session on Bayesian Statistics: Application to Cosmology @ IISER, Tirupati.

- Teaching assistant for a course on Electricity and Magnetism course (PHY-211) and Introductory mathematical methods course (IDC-111) in spring 2018 @ IISER, Tirupati.

Telescope Time

1. Allocated 10 hours of telescope time with GMRT to study Milky Way analog galaxies.
   K Aditya, Mousumi Das, Peter Kamphuis (45 126).

2. Allocated 16 hours of telescope time with GMRT to observe extremely thin edge-on galaxies.
   K Aditya, Arunima Banerjee (36 075).

Press Release

1. Press release by Department of Science and Technology (DST), Government of India
   Different rates of star formation in spiral and irregular galaxies can help understand dark matter & gravitational instabilities

2. Article in national newspaper *The Hindu*
   This IIA study could help understand how gravitational instabilities are connected to galaxy evolution

Publications

1. **Aditya, K.** 2023, "The curious case of missing dark matter in ultra-diffuse galaxy NGC 1052-DF2 " , Under Revision, A&A Letters

2. **Aditya, K.** 2023, "Role of dark matter in driving gravitational instabilities in a two-fluid disc " , Under Revision, MNRAS

3. **Aditya, K.** 2023, "Stability of galaxies across morphological sequence" Monthly Notices of the Royal Astronomical Society, Volume 522, 2543, arXiv:2304.07734

4. **Aditya, K.**, Banerjee, A., Kamphuis, P., Mosenkov, A., Makarov, D., Borisov, S. 2023, "HI 21cm observations and dynamical modelling of the thinnest galaxy: FGC 2366" Monthly Notices of the Royal Astronomical Society, Volume 526, 29, arXiv:2308.13312

5. **Aditya, K.**, Kamphuis, P., Banerjee, A., Borisov, S., Mosenkov, A., Antipova, A., Makarov, D. 2021, "HI 21 cm observation and mass models of the extremely thin galaxy FGC 1440" Monthly Notices of the Royal Astronomical Society, Volume 509, 4071, arXiv:2110.15478

6. **Aditya, K.** and Banerjee, A. 2021, "How "cold" are the stellar discs of superthin galaxies?" Monthly Notices of the Royal Astronomical Society, 502, 5049, arXiv: 2002.09198

7. **Komanduri, A.**, Banerjee, I., Banerjee, A. and Sengupta, S. 2020, "Dynamical modelling of disc vertical structure in superthin galaxy 'UGC 7321' in braneworld gravity: an MCMC study" Monthly Notices of the Royal Astronomical Society, 499, 5690, arXiv: 2004.05627

Preprints

1. **Aditya, K.**, "Stability of two-fluid galactic disc under the influence of an external tidal field", arXiv:1905.10746

PhD Thesis

1. **Aditya, K.**, "HI 21 cm observations and dynamical models of superthin galaxies", arXiv:2308.13580