

Research Overview and Future Directions

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Introduction

- Senior Research Scholar at IUCAA, Pune.
- Expertise in cosmological simulations and theoretical modeling.
- PhD Thesis submitted: "Interplay " Thesis approved by examiners and awaiting defence.
- Current position ends in July 2025.

Past Research: Overview

- Focused on dark matter halo dynamics in cosmological simulations.
- Studied halo relaxation responses using **IllustrisTNG, EAGLE, and CAMELS**.
- Developed self-similar models for galaxy formation and tested against simulations.
- Analyzed astrophysical feedback processes, especially **AGN feedback impacts** on halo structure.

Key Contributions

- Established connections between galaxy formation processes and halo relaxation timescales.
- Quantified the impact of baryonic physics on dark matter distribution.
- Improved time-correlation analysis techniques for astrophysical feedback processes.
- Collaborated on large-scale survey mock simulations for EUCLID and DESI.

Proposed Research Directions

- Enhance time-correlation methods to study baryonic feedback in dark matter haloes.
- Develop and implement **cosmological MHD simulations** for better theoretical modeling.
- Investigate galaxy-halo connections with a focus on AGN-driven relaxation processes.
- Run mock simulations to improve interpretations of observations from large-scale surveys.

Why KIAS?

- Aligns with my research focus on dark matter haloes and galaxy formation.
- Opportunity to collaborate with experts in theoretical and computational astrophysics.
- Access to resources and a vibrant academic environment.
- Chance to contribute to cutting-edge cosmological research.

Summary

- Extensive experience in cosmological simulations and astrophysical modeling.
- Strong focus on understanding baryonic impacts on dark matter dynamics.
- Excited to contribute to KIAS's research goals while pursuing innovative directions.
- Looking forward to discussing my research and ideas further.

Thank You!

Questions?



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