



Leibniz-Institut für Astrophysik Potsdam

The Cosmology and High-energy Astrophysics Section at the Leibniz Institute for Astrophysics Potsdam (AIP) invites applications for a

Doctoral student position (m/f/d) in Computational Galaxy Formation

for a project on cosmic ray feedback in state-of-the-art MHD simulations of galaxy formation.

Overview

Funding for these positions is provided by the European Research Council (ERC) through the PICOOGAL project *Mind the Gap: from Plasma Kinetics to Cosmological Galaxy Formation*. The project aims at studying a diverse set of problems ranging from the plasma physics of cosmic-ray transport, to exploring the impact of cosmic rays and magnetic fields on the formation and evolution of galaxies and galaxy clusters, to verifying the resulting non-thermal signatures in galaxies and clusters. The goal of the PhD project lies in progress toward a new generation of magneto-hydrodynamical simulations of the formation of galaxies that include the physics of magnetic dynamos and cosmic ray transport in configuration and momentum space across cosmic time.

Your tasks

- Participation in further developments of innovative algorithms for modelling spectral cosmic ray transport in the cosmological simulation code AREPO, an advanced moving-mesh technique to solve the magneto-hydrodynamical (MHD) equations
- Verify code implementations in idealized MHD simulations of isolated galaxies
- Carry out state-of-the-art calculations of galaxy formation with spectral and spatial cosmic ray transport
- Adapt a mock simulator for multi-frequency non-thermal radiation processes (from radio to gamma-rays wavelengths)
- Analyse simulations and develop conceptually transparent models to extract a physical understanding of the underlying astrophysical processes

Your profile

- Master degree in Physics or Astrophysics
- Thorough background in Astrophysics, Physics and Computational Methods
- Very good to excellent programming skills (e.g. C/C++ or Python)
- Very good analytical and mathematical skills are an advantage
- Hands-on experience in analyzing cosmological Arepo simulations in the context of the proposed project (magnetic dynamos or cosmic ray transport) is desired
- Self-motivation, creativity, flexibility and the ability to work alone and in a team are highly appreciated

Conditions

Salary and benefits are attractive and commensurate with those of public service organizations in Germany at 66% of the TV-L level E13. We also provide social benefits of the collective agreement for the public service (TV-L) incl. the company pension VBL with pension for reduced earning capacity and surviving dependents as well as a subsidy for the job ticket. The appointment will be for an initial period of two years (with a possible extension of up to a maximum of 4 years and 1 month in total). The position is anticipated to start by July 1, 2023, but this is subject to individual arrangements.

Application

To apply, please send a single PDF (up to 10 MB), with your Curriculum Vitae, cover letter, a list of references (2 or more) and statements on education and skills to cpfrommer@aip.de. For questions on the offered position please contact Prof. Dr. Pfrommer at the address below. Applications received before January 15, 2023 will receive full consideration.

Equal opportunities are an integral part of personnel and organisational development at the AIP, therefore applications from men and women are equally welcome. People with disabilities will be given preferential consideration if they are equally qualified and skilled. The AIP values and promotes a respectful and tolerant working atmosphere. It has therefore adopted a Code of Conduct.

Your application documents will be kept for at least three months after completion of the appointment process. As a rule, your documents will be made available to a selection committee and to the committees and officers to be involved.

Contact

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