Leibniz-Institut für Astrophysik Potsdam

The Leibniz Institute for Astrophysics Potsdam (AIP) is dedicated to astrophysical questions ranging from the study of our sun to the development of the cosmos. Research focuses on stars, exoplanets, extragalactic astrophysics, and cosmology as well as the development of research technologies in the fields of spectroscopy, robotic telescopes and e-science. The AIP carries out its research mission within the framework of numerous national, European and international collaborations. The institute is the successor to the Berlin Observatory, founded in 1700, and the Astrophysical Observatory Potsdam, founded in 1874, which was the first institute in the world to dedicate itself explicitly to astrophysics. The AIP has been a member of the Leibniz Association since 1992. Around 200 employees work at our location in the middle of a beautiful park landscape in Potsdam, not far from Berlin.

The AIP invites applications for

Doctoral student positions (m/f/d) in Computational Astrophysics

for projects in Computational Galaxy Formation and Computational Fluid Dynamics.

Overview

Funding for these positions is provided by a new initiative pursuing multidisciplinary collaborations between astrophysics and climate modelling. At the core of this newly funded Leibniz ScienceCampus SCALES are next-generation simulation techniques, hybrid modelling strategies, and the use of machine learning, particularly neural networks that learn physical laws with the goal to significantly improve the representation of subscale processes in astro- and climate-physics.

One project aims at studying the multi-scale nature of the gaseous reservoir surrounding massive galaxies and links the central galaxy to its broader cosmological environment. The other project studies the emergence of coherent large-scale streams in a turbulent flow, with important application to protoplanetary discs and planets. The PhD students will develop code and conduct high-resolution fluid-dynamical simulations using novel innovative tools.

Your tasks:

- Participation in code development of thermal instabilities in innovative multi-fluid hydrodynamics with applications to galaxies and the Earth's atmosphere (project 1) or devise turbulent closure schemes via physics informed neural networks to understand large-scale coherence in planetary science (project 2)
- Run two-fluid simulations of global galaxies with the moving mesh code AREPO (project 1) or run NIRVANA hydrodynamical turbulent simulations with a large range of scales (project 2)
- Carry out state-of-the-art cosmological simulations of galaxy formation with the effective 2-fluid model and compare results to direct simulation with the multi-phase CRISP model (project 1) or run global, long-term simulations of protoplanetary disks with newly developed subgrid model to understand planet formation (project 2)
- Analyse simulations and develop conceptually transparent models to extract a physical understanding of the underlying astrophysical processes
- Compare the results to cloud formation in the Earth atmosphere (project 1) or jet streams in climate models (project 2), thereby interacting with our colleagues in climate sciences

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 developing code, running hydrodynamical simulations, and experience in neural networks are desired
- Self-motivation, creativity, flexibility and the ability to work alone and in a team will be recognized as key assets

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 initial appointment will be for two years with an expected extension up to a total of 4 years and 1 month. The position is anticipated to start by November 1, 2026, but this is subject to individual arrangements.

Application

To apply, please register at the AIP recruitment portal

https://jobs.aip.de/rec044

and follow the instructions to upload the following documents, all in PDF: cover letter, curriculum vitae (including a list of publications), University transcripts, and a statement on education and skills (max. 3 pages, e.g. describing your previous coding and neural network expertise), and the names of 2-3 individuals willing to provide reference letters upon request. For questions on the offered position please contact Prof. Dr. Pfrommer at cpfrommer@aip.de. Applications received before **August 15, 2026** will receive full consideration.

Equal opportunities are an integral part of personnel and organisational development at the AIP, therefore applications from women and men 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.

Leibniz-Gemeinschaft

TOTAL E-QUALITY