ÖAW — AUSTRIAN ACADEMY OF SCIENCES

FEMTECH PROJECT: DISKS FOR LIFE

INTERNSHIP OPPORTUNITY FOR FEMALE STUDENTS AT INSTITUT FÜR WELTRAUMFORSCHUNG (IWF)

We are looking for a **Bachelors/Masters level student** in the Planet-forming Disks and Astrochemistry group at IWF, Graz. The FEMTech Internship (Praktika für Studentinnen 2025) is only for **female students** and it is **full time** for the duration of up to 6 months (**maximum 6 months or 176 calendar days: 8,480 euros**). The internship is expected to be a part of Bachelors/Masters thesis and should start in the second half of 2025. The internship application is to be filled with the help of the student and the call **opens on March 10**, but since the funding is limited, we plan to **apply asap**. Please contact Dr. Kundan Kadam for further details.

BACKGROUND

Planetary systems, such as our Solar system as well as exoplanets, are born in a rotating protoplanetary disk that surrounds a newborn star. A protoplanetary disk consists of mainly gas (hydrogen and helium), with a small contribution from heavier elements in the form of dust and ices. In our research group, we are interested in studying several aspects of protoplanetary disk structure and evolution from both theoretical and observational point of view.

There is a future concept mission called Large Interferometer for Exoplanets (LIFE), which consists of several satellites orbiting around the Earth in a configuration and acting as an interferometer in mid-infrared wavelengths. Interferometry is technically challenging as compared to a single telescope, but it allows the system to function like a much larger, virtual telescope. The output from the telescope could be images, but mainly it is interferometric quantities, and we need to fit to a model to this data, in order get information on the object. The LIFE mission is focused on exoplanet characterisation, but we are interested in the applicability of this observatory to protoplanetary disks. More specifically, the dust continuum emission that the inner disk emits at mid-infrared wavelengths.

RESEARCH PROJECT

The rough outline of the project is as follows.

The project itself is related to **modelling the observability of the inner disk structure of protoplanetary disks with LIFE mission**, as a part of “Disks for LIFE” initiative. We will explore if the current tools for ground-based interferometry can be used for our purpose. In particular, the “oimodeler" project that is used for MATISSE instrument of Very Large Telescope (VLT).

Additionally, we have some simulations of protoplanetary disks that show substructure in the inner disk. We will also explore the possibility to use RADMC-3D code to get dust continuum images from simulation data. These images can be processed by oimodeler to obtain interferometric quantities, to see if they can be observed with LIFE.

The project will involve collaborations with LIFE team, and with interferometric experts on MATISSE and Dr. Peter Woitke on technical aspects. The project will be code-heavy so interest in programming (especially Python) is a requirement. Ability to learn physics-heavy topics in observational/ theoretical astrophysics of protoplanetary disks is also necessary.

CONTACT

Please let me know if you have any more questions or you need more information, reading material etc.

Dr. Kundan Kadam

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