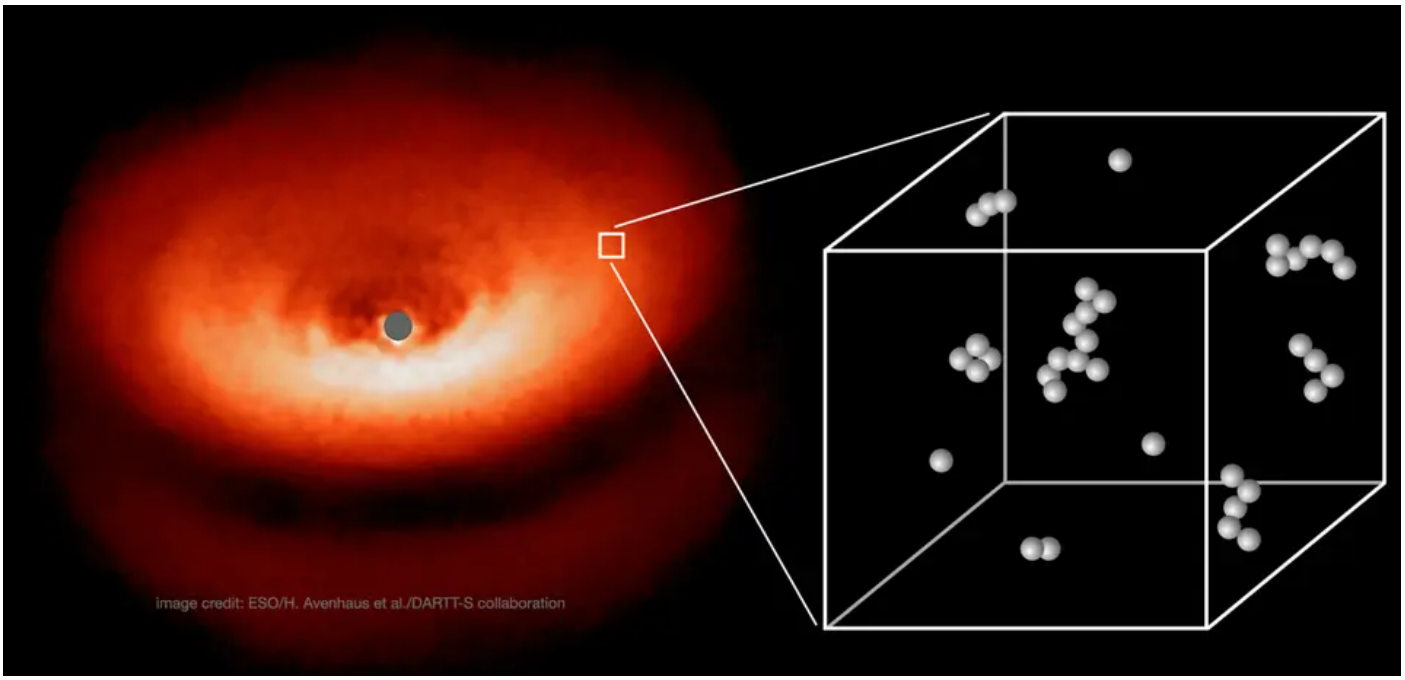
MAX PLANCK INSTITUTE
FOR SOLAR SYSTEM RESEARCH



PhD project in Planet Formation

AUGUST 05, 2026

Open PhD Project | Planetary science | PLANETOIDS

Vertically resolved modelling of dust evolution in a protoplanetary disk in the first comprehensive model that connects all stages of planet formation

The Planet Formation Group is offering a PhD opportunity focused on vertically resolved modelling of dust evolution in a protoplanetary disk. Our research aims to build the first comprehensive model that connects all stages of planet formation, from micron-sized dust grains to fully formed planets, with a unique emphasis on leveraging evidence from Solar System materials.

Dust coagulation and transport are typically studied in a 1-dimensional framework, as most of the dust mass is confined to the protoplanetary disk midplane. However, scattered-light observations show that many disks are vertically puffed up and their surfaces exhibit substructures different from those seen at millimeter wavelengths. Our group has been developing the publicly available 2-D Monte Carlo code *mcdust*, which resolves dust evolution in both radial and vertical dimensions. This project assumes further development of the *mcdust* code in order to address disk vertical structure and its interplay with the midplane. Depending on the interests of the candidate, the project may include:

- Self-consistent thermochemical modeling, for example using the Dust and Lines code (DALI) to investigate the feedback between disk thermal structure and dust composition and evolution.
- Including external disk photoevaporation, for example using the Python Utility For Fuv Irradiated disc deNsities (PUFFIN) to study the formation of the youngest planetesimals and comets.
- Including dust aggregate electrostatic charging and its impact on dust coagulation.

Due to the nature of this project, preference will be given to candidates with experience in Fortran and Python code development.

Planet formation research group at MPS

PLANETOIDS: Formation of planetary building blocks throughout time and space. Lise Meitner Group / ERC Starting Grant

Application and admission to the IMPRS Solar System School

Please note that regular deadlines apply for the submission of applications.

IMPRS PhD online application system

Please check for currently active calls and advertised open projects first.To apply, please register in the on-line application system. You can then log in to your account using your registration ID and password. You will be able to edit, save, preview, and submit your application, and follow its status after submission.

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