PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

Open PhD Position at Freie Universität Berlin, offered only to Chinese CSC scholarship candidates 2025

Department/Institute: Institute of Geological Sciences

Subject area: Planetary Science and Remote Sensing

Name of Supervisor: Prof. Dr. Kai Wünnemann

Number of open PhD positions: 1 Full-time

Type of the PhD Study: Full-time

Project title: Impacts of Cosmic Bodies on Icy Satellites

PhD Project description:

The icy moons in the Jupiter and Saturn systems, and in particular Europa and Enceladus, are prime targets for planetary exploration given their high astrobiological potential. Material transport from the surface to the underlying ocean can affect the ocean chemistry and hence its habitability. On the other hand, the surface may largely be affected by large scale impacts and ice shell dynamics that could facilitate the exposure of ocean material. The project aims at modelling impacts of cosmic bodies (different asteroid types and comets) into the ice shell in order to constrain the conditions for complete penetration of the ice crust, the morphology of surface structures resulting from impacts, and the heat delivered upon impact to the ice crust. The latter is important as it may contribute to the convective dynamics of the ice. The widely used software package iSALE, specifically developed for modelling hypervelocity impacts from the project PI, will be used to carry out systematic parameter studies (impactor size, composition, mechanical properties, thickness and temperature profile of the ice shell, etc.). Due to the special characteristics of icy targets modifications and adjustments of the software may be necessary. Basic programming skills in Python are required to process numerical model data. The PhD student will be guided in using iSALE and in adapting the source code written in Fortran. If necessary, Fortran training will be provided. The study paves the way for the interpretation of observations that will be obtained in upcoming mission data from NASA's Europa Clipper mission and ESA's JUICE mission.

Language requirements:

- IELTS: 6,5 oder TOEFL: 95 ibt

Academic requirements:

MSc in Planetary Science, Geophysics or Physics, Geological Science, Glaciology, Computational Engineering. Programming skills in Python are required, Fortran knowledge is welcome

Information of the professor or research group leader (website, awards etc.):

Kai Wünnemann is professor of Impact and Planetary Physics at the FU and also the head of the Solar System, Impacts & Meteorites department at the Museum für Naturkunde Berlin (MfN) and head of the Science Program Dynamics of Nature. His research aims at revealing the collision history of our solar system, in particular the earth-like planets and minor planets (asteroids). He investigates physico-chemical and geological-mineralogical processes during an impact through field studies and using samples from impact craters and meteorites, laboratory experiments and numerical models. He chairs the working group Impact Physics of NASA's DART Mission and the ongoing ESA Hera Mission to the asteroid system Didymos-Dimorphos

On 15 August 2022, he received the Barringer Award, the most important scientific award given in the field of impact and crater research, from the Meteoritical Society.

Website:
FUB: https://www.fu-berlin.de/informationen-fuer/beschaeftigte/personalia/neuberufen/neuberufene-aktuell/wuennemann/index.html
MfN:https://www.museumfuernaturkunde.berlin/de/ueber-uns/team/kai.wuennemann

Please note:
In a first step, the complete application should be uploaded to the online portal (https://fuberlin.moveon4.de/form/60acfece5d328710e40bdbd5/eng) for evaluation by January 15th, 2025.