ONERA
THE FRENCH AEROSPACE LAB

www.onera.fr

PROPOSAL FOR A PHD THESIS TOPIC

Title : Investigation of Dust adhesion with an Original Combined Experimental Approach (DOCEA) to support planetary, lunar and asteroid missions

Reference : **PHY-DPHY-2023-09** *(to be included in all correspondence)*

PhD Start : 01/10/2023	**Deadline for application:** 15/05/2023

Tags : Experimental research, Lunar Dust, Surface, Charging, Adhesion, Mitigation, EL3

Desired skills and qualifications

Master or equivalent degree in physics, chemistry, geology, aerospace related fields. Good laboratory practice in the field of chemistry and physics, specifically in microscopy (optical, SEM, AFM).

Practical knowledge on analytical methods and chemical analysis (EDX, XPS). Knowledge on programming languages is strongly recommended (Python, Java).

Willing and able to work and communicate in a transnational and transdisciplinary environment.

Willing to spend some months at ESA/ESTEC to complete part of the work objectives.

Fluent and good writing skills in English

Presentation of the doctoral project, context and objectives

The physics, instrumentation, environment and space department is seeking a highly motivated PhD student for a research project on moon dust contamination in extra planetary environment.

At ONERA Toulouse Center you will be working on innovation for future robotic and manned missions to the Moon. While previous manned missions lasted a few days each, the next ones are planning a continuous presence at the lunar surface. The science community and industry are going to operate their instruments and systems in harsh conditions, especially with fine, adhering and very abrasive dust.

Your tasks and responsibilities will consist in

- Filling the knowledge gap in dust adhesion physics in a representative space environment
- Creating test bench and methods to verify and quantify dust adhesion
- Feeding and improving current simulation tools/models
- Participating to the development of in-flight dust sensors
- Preparing mitigation techniques

You will perform part of the experimental tasks at ESA Technical Center located in the Netherlands.

Find more information on ESA web site : this link.

Planned collaborations

European Space Agency, Institut de Radioprotection et de Sûreté Nucléaire, CNES

Host Laboratory at ONERA

Department :
Physique, instrumentation, environnement, espace

Location : Toulouse

Contact : Jean-Charles Matéo-Vélez (PhD co-supervisor)

Tel. : +33 (0)5 62 25 28 86

Email : jean-charles.mateo_velez@onera.fr

PhD supervisor

Name : Emmanuel Porcheron

Laboratory : IRSN

Tel. : +33 (0)1 69 08 55 06

Email : emmanuel.porcheron@irsn.fr

Find more information on : https://www.onera.fr/rejoindre-onera/la-formation-par-la-recherche