Bern, November 14, 2022

The Group for Optical Astronomy of the Astronomical Institute, University of Bern is inviting applications for a

**PhD position**

in the field of

**Debris attitude motion and object characterization using high resolution single photon counter light curves**

The Optical Astronomy group of the Astronomical Institute of the University of Bern (AIUB) has a world-leading position in the domain of optical surveys and characterization of space debris. AIUB operates the Swiss Optical Ground Station and Geodynamics Observatory Zimmerwald equipped with the 1-m multi-purpose laser and astronomometry telescope (ZIMLAT) and five additional telescopes with apertures ranging from 0.2 to 0.8 meters. AIUB participates in several civilian space debris tracking networks such as the International Scientific Optical Observation Network (ISON) and the DLR-AIUB network of small robotic telescopes SMARTnet. With its research focus on space debris, space surveillance, and space situational awareness (SSA), the group is deeply involved in various ESA-funded studies, performs space debris surveys with the ESA 1-m telescope at Tenerife on behalf of ESA, and operates the ESA Expert Centre for Space Safety.

The currently proposed space debris remediation measures include the active removal of large objects. This technique requires precise knowledge of the attitude state (spin rate and spin axis orientation) and state changes of the target objects. Non-resolving optical observations of the brightness variations, so-called light curves, are a promising technique to determine rotation or tumbling rates and the orientation of the actual rotation axis of space objects, both in the body-fixed and the inertial frame.

The successful candidate shall:

1. Develop and implement an experimental single photon counter light curve receiver package and integrate it on the ZimMAIN telescope. Complement this development by the installation and qualification of an event-based camera.
2. Develop algorithms to fuse the hypertemporal data from the single photon detector (event-based camera) and possibly simultaneous SLR measurements to characterize the attitude motion together with additional object characteristics.

3. Assess the potential of the technique by means of an observation campaign with the aim to determine attitude states.

Requirements: University degree (master or equivalent) in astronomy, geodesy, physics, mathematics or a similar discipline. Fluent English; basics in German are an advantage.

Appointment: immediately, open until filled.

Application: December 20, 2022

Salary: Based on the regulations of the Swiss National Science Foundation

Contact: Head of the Optical Astronomy Group, Prof. Dr. Thomas Schildknecht (Tel. 031 684 85 94, email thomas.schildknecht@aiub.unibe.ch, Office 210a).

Equal opportunity environment is important to us, and we welcome applicants from groups that are traditionally underrepresented in physics and astronomy. We will be particularly pleased to receive applications from women for the advertised position.