

Twinkle: a visible and near-infrared space-based observatory for exoplanet and solar system spectroscopy

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The Twinkle Space Mission is a space-based observatory that has been conceived to measure the atmospheric composition of exoplanets, study bright stars and brown dwarfs, and reveal the surface mineralogy of Solar System objects. The satellite is based on a high-heritage platform and will carry a 0.45 m telescope with a visible and infrared spectrograph providing simultaneous wavelength coverage from 0.5 - 4.5 μm . The spacecraft will be launched into a Sun-synchronous low-Earth polar orbit and will operate for a baseline lifetime of seven years.

Twinkle's rapid pointing and non-sidereal tracking capabilities will enable the observation of a diverse array of Solar System objects, including asteroids and comets. Twinkle aims to provide a visible and near-infrared spectroscopic population study of asteroids and comets to study their surface composition as well as obtaining high-SNR spectra of the outer planets and their moons. Its wavelength coverage, and position above the atmosphere, will make it particularly well-suited for studying hydration features that are obscured by telluric absorption from the ground, as well as searching for other spectral signatures such as organics, silicates and CO_2 .

Twinkle is available for researchers around the globe in two ways:

- 1) joining its collaborative multi-year survey programme, which will observe hundreds of exoplanets and solar system objects; and
- 2) accessing dedicated telescope time on the spacecraft, which can be freely schedule for any combination of science cases.

I will present an overview of Twinkle's capabilities and discuss the broad range of small bodies the mission could observe, demonstrating the huge scientific potential of the spacecraft.

Keywords: space-based visible and near-infrared spectroscopy