Twinkle: a low-Earth orbit, visible and infrared 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 characterise exoplanets, stars and 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 in this highly stable thermal environment 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 and monitor activity. Its wavelength coverage and position above the atmosphere will make it particularly well-suited for studying hydration features that are obscured by telluric lines 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 they can schedule for any combination of science cases.

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

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