Photometric monitoring is widely used for characterizing stars with variable brightness, like active stars, young stars, and stars with transiting exoplanets. Space telescopes are ideal tools for continuously observing variable stars, avoiding the drawbacks of ground-based observations. We propose to build an infrared CubeSat-type space photometer working with SPIRou and SPIP, which are ground-based infrared spectropolarimeters/velocimeters at the Canada-France-Hawaii Telescope, and the Télescope Bernard Lyot.

The goal of the SPIRou/SPIP CubeSat, nicknamed MARSU, is to achieve continuous (duty cycle >90%) photometric monitoring in the YJH bands (1-1.8um) for stars up to H~11, at a precision better than 1mmag for up to 10min exposure times, over continuous periods of up to 3 months and simultaneously with SPIRou/SPIP observations. With such specifications, MARSU will provide unique opportunities to study young and active dwarfs hosting transiting close-in exoplanets (like AU Mic, K2-33, V1298Tau, and Trappist-1) in a way that can compete or even outperform current photometric space probes working at optical wavelengths such as TESS, and for a much smaller cost.

MARSU is managed by IRAP/OMP in France, with financial contributions CNES for the design study of the science payload; options are open for broadening the collaboration to international partners, in particular regarding the platform to host the payload. Ultimately, the goal is to aim for a fleet of ~10 MARSU-like CubeSats so that a few hundred of targets can be monitored over the lifetime of the probes, with obvious synergies with large exoplanet missions like ARIEL.