The Asgard/BIFROST beam combination instrument for VLTI

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Abstract

We present science cases and instrument design for the BIFROST short-wavelength (Y/J/H-band), high spectral dispersion (R=25,000) instrument that we building at Exeter for the visitor focus of ESO's Very Large Telescope Interferometer (VLTI). The instrument will be part of the ASGARD Suite of instruments that includes also a fringe tracker, adaptive optics system, and mid-infrared nuller. Asgard/BIFROST will unlock powerful venues for studying accretion & mass-loss processes at the early/late stages of stellar evolution, for detecting accreting protoplanets around young stars, and for probing the spin-orbit alignment in directly-imaged planetary systems and multiple star systems. In conjuncture with infrastructure improvements on the VLTI unit telescopes, the instrument will also enable off-axis spectroscopy of exoplanets in the 0.03-1" separation range, enabling high-SNR, high spectral resolution follow-up of exoplanets detected with Gaia/ELT/JWST. We discuss subcomponents, such as the light injection module, the photonics beam combiner, and the spectrographs.

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