V224a The NIR Polarimetric Differential Imaging Mode of the Subaru Coronagraphic Extreme Adaptive Optics

Jin Zhang (The University of Tokyo), Motohide Tamura (The University of Tokyo, ABC, NAOJ), Olivier Guyon (The University of Arizona, ABC, NAOJ), Tomoyuki Kudo (NAOJ), Julien Lozi (NAOJ), Barnaby Norris (The University of Sydney)

Young stars can form in gas-rich and dusty protoplanetary disks. The direct imaging of young planetary systems can reveal when, where and how the transition from the star formation to the planetary system takes place. The structures of planet-forming disks can be detected with the NIR polarized light.

We will combine high-precision NIR polarimetric differential imaging (PDI) with high-contrast imaging of Subaru Telescope to observe the formation and early evolution of planetary systems with very high sensitivity, to distinguish the scattering from the thermal emission, to map the planet-disk gravitational interactions, to measure the dust compositions of disks and to investigate the dust shells of evolved stars. The images of the inner regions of planetary systems related to habitable planets formation can be obtained with NIR PDI. By adding new optical components to the Subaru Coronagraphic Extreme Adaptive Optics (SCExAO), we will develop two complimentary polarimetric imaging modes, including the spectropolarimetry mode with CHARIS and the fast switching PDI mode with a high-speed low-noise NIR camera. The double-difference technique and the triple-layer differential polarization calibration will be used to obtain the high sensitivity. We will report the details of the NIR PDI modes and the status of the new instrument.