P205a **High Contrast and High Dispersion Spectroscopy Capability of IRCS (R∼20,000, K-band)+AO188 in Subaru Telescope for Characterizing Nearby Directly Imaged Exoplanets**

Stevanus Kristianto Nugroho (Tohoku University), Toru Yamada (Tohoku University)

High contrast and high dispersion spectroscopy has been proven to be a powerful method to characterized directly imaged exoplanets. The telluric and stellar lines are spectroscopically separated from the planetary signal due to Doppler shift. We simulate high contrast and high dispersion spectroscopy of directly imaged exoplanet using IRCS (R∼20,000)+AO188 in 8.2 meter Subaru telescope. We took archived data from SMOKA (Subaru-Mitaka-Okayama-Kiso-Archive) in K-band (1.97-2.47 μm) as the stellar spectrum template. The exoplanet spectrum was created to mimic the thermal emission of β Pictoris b then Doppler shifted 15 km/s. The planet to star contrast (F_p/F_s) and separation were varied to find the limit of this instrument. The stellar and telluric lines were removed using the help of SVD (Singular Value Decomposition) technique. The exoplanet spectrum was recovered by cross correlating the residual with the injected spectrum by varying radial velocity. With equivalent 9.4 hours of exposure time, we succeed to recover the planet signal at $5\sigma_{noise}$ for F_p/F_s as low as 2.5x10^{-5} at ∼0.35" from the host star. While at ∼0.15", $5\sigma_{noise}$ detection of F_p/F_s is only at 2.5x10^{-4}. This technique can still be improved by using coronagraph, better instruments (e.g. IRD+SCExAO), and more sophisticated telluric+starlight removal algorithm so that it will be a great companion to characterize the directly imaged exoplanets that will be found by TMT, E-ELT, TESS, WFIRST and JWST.