

## M16c Development and Future of DST Spectro-Polarimeter at Hida Observatory

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Magnetic field is the key to understand and explore the intrinsic properties of solar atmosphere and activities. Polarimeter is the mandatory tool to infer the solar magnetic fields through the Zeeman and Hanle effects.

Currently a new spectro-polarimeter is under development on DST (Domeless Solar Telescope) at Hida observatory. The polarization modulator consists of a continuously rotating 50 mm diameter waveplate with a retardation that is nearly constant at around  $127^\circ$  in 500 – 1100 nm, and a PBS (Polarization Beam Splitter) with an extinction ratio higher than 1:300. The main upgrades to our spectro-polarimeter includes (1). a 3D printed modulator case; (2). a coude mirror based slit scan system; (3). an infrared InGaAs camera (Allied Vision) with a maximum read-out speed of 301 FPS; (4). a combined use of the AO system; (5). a standardized data calibration pipeline. With the new polarimeter, a sensitivity of 0.02% could be achieved in 4-5 seconds (on disk) or 6-10 seconds (off limb) for 500-1100 nm, making it possible to obtain one set of full Stokes map in at least 8 minutes with a maximum FOV (Field-of-View) of  $127'' \times 240''$  and a scan resolution of  $2''$ . The polarimeter could be installed either on the vertical spectrograph for high dispersion observation, or on the horizontal spectrograph for simultaneous multi-wavelength observation.

We will present some interesting results obtained by this new system, and the future plan of (1). doubling the FOV by developing new PBS; (2). combining the slit scan system with the AO system in a more flexible manner.