Contribution ID: **106** Contribution code: **S5 Quantum Technology** Type: **Oral Presentation**

Design and implementation of a laboratory prototype of a fiber-fed Fourier transform spectrograph for the Thai National Telescope

Friday 24 June 2022 11:30 (15 minutes)

The Fourier transform spectrograph (FTS) is an important tool that has been applied in many fields of research. In astronomical observation, the FTS has been used for analyzing stellar objects. Most of FTS that hav been designed and used with large telescope are based-on free space design to maximize flux throughput at the detector. However, the limited space at a focal plane of a large telescope may lead to complex design of the FTS if not impossible. To overcome the space limitation, a fiber-fed design of FTS has gained more interest. The used of fiber to feed the star incoming flux from the telescope to the spectrograph makes comfortable for an optical alignment of the system. Nevertheless, the main challenge of the fiber-fed FTS is a low flux throughput due to a single point field of view and a transmission loss in the optical fiber. In this work, we report the development of the laboratory prototype of a fiber-fed FTS specifically designed for the Thai National Telescope (TNT). Off-the-shelf optical components have been mainly used in the implementation. To improve the signal-to-noise ratio of a low flux signal, a balanced detection scheme has been investigated. The simultaneous detection of scientific and metrology interferograms for correction of the phase distortion of the interferogram has been implemented. The phase distortion in the measured interferogram was corrected by using peak-valley positions of the metrology interferogram. The instrument line shape, corresponding with the spectral resolving power of the system was measured to be higher than 19,000. Furthermore, the scan range of the FTS was maximized to obtain the maximum spectral resolution of the implemented system. The achieved maximum optical path difference is currently about 30 mm.

Author: ARTSANG, Pornapa

Co-authors: MEEMON, Panomsak; BUISSET, christophe (National Astronomical Research Institute of Thailand)

Presenter: ARTSANG, Pornapa

Session Classification: S5 Quantum Technology

Track Classification: Quantum Technology