



Contribution ID: 16

Type: not specified

Preliminary Design of Imager Filter Wheel Mechanism (IFWM) for Keck Observatory SCALES Instrument.

Slicer Combined with Array of Lenslets for Exoplanet Spectroscopy (SCALES) is a thermal infrared instrument for Keck-II to be built at W. M. Keck Observatory. Functionally, the instrument layout is divided into three parts, i.e., Fore-optics, IFS module, and Imaging Channel. The Imager filter wheel Mechanism is a part of the Imaging channel.

The Imager Filter Wheel Mechanism is a double-stacked filter wheel mechanism that hosts 2 open slots and 16 filters matched to the various imaging bandpass of the imager. The wheels rotate to bring the required filter into the FOV of the optical beam, and the whole system works under the cryogenic temperature, i.e., 77K. Designing an instrument for a cryogenic temperature and high vacuum environment is critical. It involves selecting drive mechanisms and parts materials compatible with the work environment. The other affecting parameter for the system is the temperature difference from room to cryogenic temperature. The system contracts and expands due to temperature changes. This demands the system to be carefully designed with proper choice of materials, selection of suitable machine elements, and control of dimensional tolerances to ensure the smooth running of the system in ambient as well as the cryogenic environment, without compromising on the tight tolerance requirements for the functioning of the optical systems.

The design, analysis, and calculation of the Imager Filter Wheel Mechanism will be presented in this talk, considering all parameters affecting the system design.

Presentation type

Oral

Primary author: Mr VARSHNEY, Hari Mohan (Indian Institute of Astrophysics)

Co-authors: Mr KV, Govinda (Indian Institute of Astrophysics); Mr MACDONALD, Nick (University of California, Santa Cruz, USA); Mr BANYAL, Ravinder K. (Indian Institute of Astrophysics); Mr PRAKASH, Ajin (Indian Institute of Astrophysics); Dr T, Sivaranani (Indian Institute of Astrophysics); Mrs SETHURAM, Ramya (Indian Institute of Astrophysics); Mr J. SKEMER, Andy; Mr STELTER, Deno; RATLIFF, Chris; Mr HASAN, Amirul (Indian Institute of Astrophysics); Mrs KUPKE, Reni; SALLUM, Steph; DEICH, Will; P. FITZGERALD, Michael; Mr SURYA, Arun; WANG, Eric

Presenter: Mr VARSHNEY, Hari Mohan (Indian Institute of Astrophysics)