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Keo Scientific *Zodiac* Patrol Spectrograph

Keo *Zodiac* All-Sky Patrol Spectrograph for Night Sky Studies

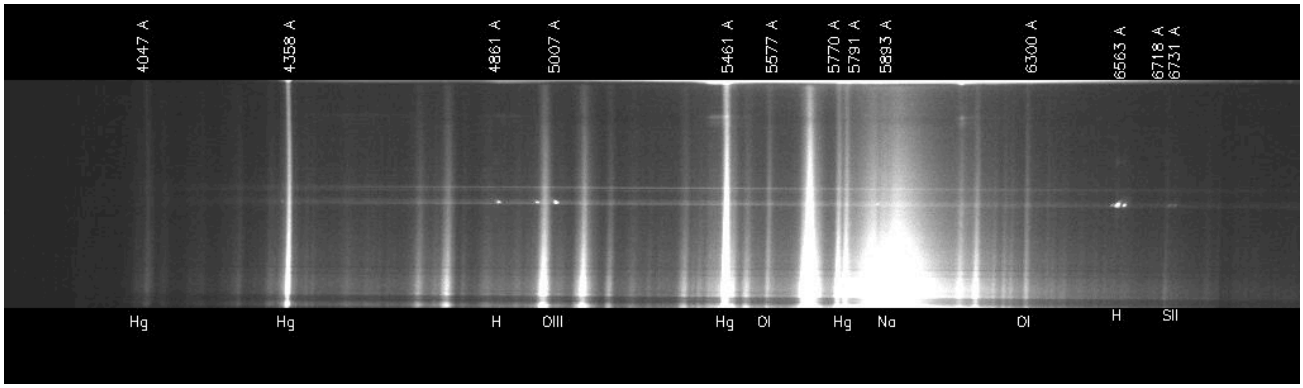
The Keo Scientific *Zodiac* All-Sky Spectrograph may be considered to be a *solid-state Meridian Scanning Photometer (MSP),* in that it images the spectrum along the entire 180-degree meridian, at all zenith angles and all wavelengths simultaneously, with no moving parts.

Features

- Fisheye lens for true all sky coverage (full 180-degree meridian, horizon-to-horizon)
- Ultra-fast f/0.95 optical chain, BBAR coated achromats/singlets/grism
- Spectral coverage 350 nm to 785 nm (several custom ranges available, please inquire)
- Spectral Resolution: 3Å/pixel
- Angular resolution: 0.176 deg/pixel (180 degrees field of view)
- High-reliability mechanical shutter for acquisition of "dark-frames"
- Temporal resolution limited only by exposure time and CCD readout time
- Several deep-cooled CCD (PI Acton *Pixis*) and EMCCD (PI Acton *ProEM*) sensor head options available
- Rackmount control unit with USB interface for instrument control
- Comes with Lenovo ThinkPad Edge S430 pre-loaded with Keo "Spectropticx" Control & Data Acquisition Software:
    - Starts and stops operation at pre-programmed local times (or at specified solar elevation angle)
    - Exposes CCD according to set exposure parameters and saves images to hard-disk.
    - Closes shutter and performs dark-frame exposures at pre-programmed times/cadence.

Options

- Field-replaceable fore-optics modules for narrow-field (non all-sky) observations (e.g., 90-degree field of view)
- Interchangeable slits, for full flexibility in performing sensitivity and spectral resolution trade-offs
- 4-position filter wheel for 2-inch filters (e.g., ND filters for daytime studies or special filters for Light Pollution studies),
- EMCCD sensor head to approach true PMT-based MSP sensitivity (single-photon detection)
- High-Transmission UV-to-NIR transmitting Plexiglass dome (for mounting on building) – 0.5-meter diameter
- Optical Grade BK7 Mineral Glass dome (for mounting on building) with Anti Reflective coating – 9-inch diameter
- Absolute spectral calibration (rayleighs)



Sample spectrum acquired through a 90-degree field of view module. Vertical axis covers -45 to +45 degree zenith angle. The bright Orion nebula was on-slit during this 60-second exposure.