**Background**

- Auroral electrons are stopped at different altitudes based on their energy [1] (Fig. I): use simultaneous multi-spectral measurements to derive energy and energy flux
- Approach: fit modeled brightness/energy ratios using an electron transport model with measurement to derive energy and fluxes

**Instrument and Data**

- High Throughput and Multislit Imaging Spectrometer (HiT&MIS): ~0.01 nm resolution (at 630nm) and FOV of 0.1 X 50° [3]
- We present June 22, 2015 G4 storm observed at Lowell, MA (42.6°N, 71.3°W) ~45° from zenith due northeast
- Simultaneous measurements: OI: 630.0 nm (red), OI: 557.7 nm (green), OI: 777.4 nm and N₂²: 427.8 nm (blue) and Ne I 630.5 nm (for cloud activity)

**Derivation of Energy and Flux**

- Energies and fluxes for the time periods chosen (T1-T8) in Fig. II are derived using three methods based on non-linear least-squares minimization by utilizing the Levenberg-Marquardt algorithm
- Two step method: two steps, one parameter (each step)

**Results**

- Brightness and the ratio methods: two parameters one step

**Summary**

- We derived energy and energy flux of an auroral event at mid-latitude during a G4 storm by fitting the model brightness/arrival flux ratios with measurements by performing non-linear least-squares minimization using the Levenberg-Marquardt algorithm
- The energy is derived to be ~100-300 eV and Flux ~ 0.8-3 ergs cm⁻² s⁻¹ and there are spatial and temporal variations.

**Instrument/ Collaboration?**

- HiT&MIS can observe six upper atmospheric emission feature simultaneously on a round the clock basis, portable
- Continuous observation at MIT Haystack facility previously
- Contact: saurav_aryal@student.uml.edu for more information

References:


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This work is supported by the NSF grant AGS1145166 ONR grant N00014-13-1-0266 and UMass Lowell internal funds.