NCAR Lyman Alpha Hygrometer

- Redesign & update of common Lyman-alpha hygrometers.
- Source: commercially available (Resonance, Ltd., Ontario) RF-excited hydride lamp.
- Detector: Hamamatsu vacuum photodiode.
- Amp: in-house design. High gain, large bandwidth.

- Fast response water vapor measurements.
- ~ 100 Hz bandwidth. Maximum response including inlet is to be determined.
- Measures H_2O number density in sample volume. Mixing ratio & dewpoint calculated from sample pressure and temperature measurements.

Enhancements

- Heated hydride-based lamp gives long life, narrow lyman-alpha linewidth, stable intensity.
- Vacuum photodiode should lessen temperature drift compared to NO cell detectors.
- Amplifier designed for minimal temperature drift and to match A/D converter input range.
- In-cabin mount will also reduce temperature induced drift.

Processing

- This instrument is not intended as a stand-alone H_2O vapor sensor. Because of long-term drift and window contamination during a flight the low-pass filtered output is forced to track an absolute sensor such as a chilled mirror dew-point sensor. This is done in post-project processing.

Maintenance

- May require cleaning of lamp and detector windows with cotton swab and AlO polishing compound every few flights depending on how much salt and photo-polymerizable vapors are present.