

# **Instrument Development for SHOW Project**

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Water is a critically important constituent throughout the stratosphere and mesosphere. The SHOW project will develop a new instrument to measure water vapour from 15km to 85km height, on a global scale, using the unique capabilities provided by Spatial Heterodyne Spectroscopy (SHS). This work builds on Canadian expertise in fabricating solid Michelson interferometers to fill a significant niche in our current capability. The SHS setup the FTS with the mirrors replaced by diffraction gratings at Littrow configuration, wavelength depended Fizeau fringes are recorded by a 320\*256 In-GaAs near infrared camera without any scanning elements, the high resolution spectral information along one detector dimension can be obtain from Fourier analysis, and the other dimension will provide the spatial information. At a limb view point, a field-widened SHS with half-angle of 6 degrees for water observations at 1364nm is desired, the resolution is 0.02nm within full bandwidth of 2nm, and the resolving power is about 68,000. The laboratory work for the instrument development and the designing, building and testing of the pre-prototype are presented.