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From Clouds to CFCs: IR spectroscopy of atmospheric and interstellar molecules.

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The IR spectral region is crucial to our understanding of atmospheric chemistry and physics. Firstly, radiative processes associated with emission and extinction are fundamental to energy transfer and the IR region in particular is central for materials at the moderate temperatures found in non-stellar environments such as this planet's atmosphere. Secondly, infrared spectroscopy is uniquely suited to remotely probing the properties of atmospheric molecules and aerosols.

We have employed the various facilities on the far IR beamline to advance understanding of atmospheric molecules such as HFCs and CFCs, and also aerosols such as water ice nanoparticles found in high altitude clouds. Our studies of crystalline water ice particles have recently been extended to both amorphous ice and to deuterium enriched crystalline ice, providing insights into fundamental questions about the water vibrations in these phases. An overview will be presented.

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IR spectroscopy, earth's atmosphere, water ice, CFCs, HFCs.

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