



Physics Colloquium

Friday, November 26, 2010, 4:00 pm, PS 3046

James McDowell

*Department of Physics
St. Francis Xavier University*

Atmospheric Physics: Cross Sections of HCFC-141b, a step toward saving the planet

As global energy needs mushroom and increasingly greater amounts of greenhouse gas emissions enter the atmosphere we observe greater ecological results in both quantity and magnitude due to the greenhouse effect. We recognize the need to reduce our emissions. To determine the concentrations of specific greenhouse gases in the atmosphere we must first determine how they might be identified. Every molecule has an absorption 'fingerprint' that is unique to that specific substance, the spectrum. By experimentally determining what wavelengths of electromagnetic radiation a substance absorbs at atmospherically relevant temperatures and pressures (i.e. the spectrum at those conditions) we can determine the molecular cross-sections of that substance at those temperatures and pressures. These cross sections are proportional to the probability of absorption by a particle of that substance of electromagnetic radiation at specific wavelengths. More absorption results in more emission directed toward the Earth's surface and thus a greater global warming potential. We will contribute to an existing database these results for HCFC-141b (1,1-dichloro-1-fluoroethane). Our experimental procedures utilize specifically Fourier Transform Infrared Spectroscopy.