

## The Diffuse Interstellar Bands: New Questions about the Chemistry of the Interstellar Medium

Tuesday

April 14

12:30 P.M.

Rm 184 NSH

**Prof. Don York**, University of Chicago

A fifteen year survey of the unidentified diffuse interstellar bands (DIBs) has been carried out at Apache point observatory using an echelle spectrograph with a resolving power of  $\sim 35,000$ . The wavelengths explored include the region 3700Å to 8500Å, so we have a large amount of complementary data on optical interstellar (identified lines) and diatomic molecules. We have a) confirmed that the strongest DIBs do not relate to molecular hydrogen and seem to exist mainly at the surface of diffuse clouds, not in their interiors; b) discovered a new, small class of DIBs that seem to exist below the surface of clouds but still to exist in the diffuse molecular part of the clouds; c) discovered evidence that the profiles can be slightly modified in the presence of a high IR radiation field (IR pumping); d) used this fact to formulate a new view that the DIBs are small molecules (not yet observed in the lab) containing only 5-7 atoms in some cases; e) enhanced the argument that the DIBs are ubiquitous in the Universe and represent a major puzzle relating to all aspects of the nature of the interstellar medium (grains, star formation, chemistry).