Ice In and On Cometary Nuclei. Michael F. A'Hearn[1] (Department of Astronomy, University of Maryland, College Park MD 20742)

Introduction: Although frozen water is almost surely the single most abundant "mineral" in cometary nuclei, there are remarkably few direct observations to constrain our ideas about its structure and form. Thus most theories are based on indirect observations.

Theoretical Ideas: Theoretical models have been developed based on a variety of assumptions. One of the topics on which there is considerable disagreement is whether there is amorphous ice or whether it is all crystalline. There are also arguments about whether the ice is at the surface or deep below the surface.

Observations: There have been a very few reports of an ice absorption feature in the near-infrared region from comets at large heliocentric distance but it is not clear whether this is from icy grains in the coma or from ice on the nucleus.

Recent observations from Deep Impact have shown that there is highly localized, crystalline ice on the surface. The observations have also shown that the bulk of the ice that is responsible for the gaseous water in the coma is buried at very shallow depths below the surface.

What does this tell us about the nature of ice in cometary nuclei? Stay tuned for the talk.