**SWIFT Observations of Cometary X-Ray and UV Emission.** D. Bodewits[1,2], G.L. Villanueva[1], M.J. Mumma[1], W. Landsman[1], S.M. Immler[1], F.S. Porter[1], G.V. Brown[3], [1]NASA/GSFC, [2]dennis.bodewits@nasa.gov,[3]LLNL

**Introduction:** The abundance of native ices in comet nuclei is a fundamental observational constraint in cosmogony. An important unresolved question is the extent to which the composition of pre-cometary ices varied with distance from the young sun. Our fundamental objective is to build a taxonomy based on cometary volatile composition instead of orbital dynamics [1]. Secondly, the interaction of the solar wind with the planets, moons and the interstellar medium is of key importance for understanding the evolution of our solar system. Solar wind-atmosphere interactions can be studied particularly well in comets, because in that case the solar wind flow is not attenuated by a planetary magnetic field and interacts directly with its atmosphere, the coma.

When solar wind ions fly through an atmosphere they are neutralized via charge exchange reactions with the neutral gaseous species. These reactions depend strongly on target species and collision velocity and the resulting X-rays are a strong diagnostic of local solar wind conditions and of bulk properties of the cometary gas [2].

The Swift space telescope [3] is unique in combining UV and X-ray instruments. Its grisms (175-520 nm) encompass known cometary fluorescence bands (e.g., $CO_2^+$, OH, CO, NH, CS, CN, etc.) that can quantify and track the water and organic ice chemistry in the coma (see Figure 1). In the X-ray, Swift's multi-wavelength approach allows linking the behavior of comets and the solar wind.

Swift now has observed 6 comets, of which 3 (9P/Tempel 1, 73P/Schwassmann-Wachmann 3C and 8P/Tuttle) were observed over the course of several months. The cadence and different instruments on board Swift made it possible to simultaneously study the short- and long term development of these comets.

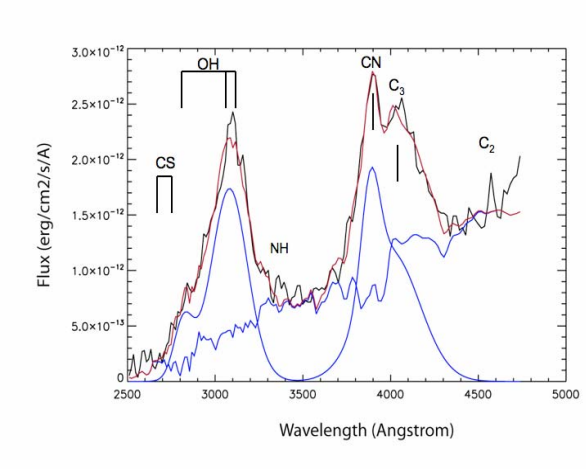


**Figure 1 - SWIFT/UVOT spectrum of comet 8P/Tuttle. A simple line model is used to indicate the prime emission features, whereas the solar continuum is obtained from Solstice archival data.**

**References:** [1] Mumma M.J. et al (1993) in *Protoplanets and Planets III, Univ. Ariz. Press*, 1177 [2] Bodewits D. et al. (2007) *Astron. Astroph. 469*, 1183. [3] Gehrels N. (2004) *Ap.J.611*, 1005