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***Friday, October 23rd, 2015***

***AET 0.204***

***3:15 PM***

**Title: 67P/Churyumov-Gerasimenko: a Comet Through the Eyes of Rosetta/ROSINA**

Comets contain the best-preserved material from the beginning of our Solar System. The composition of cometary nuclei and comae may reveal important clues about the prevailing thermodynamic and chemical conditions in the early Solar System. The *Rosetta* spacecraft orbiting the nucleus of a comet for the first time in history provides an unprecedented opportunity to closely study a comet. ROSINA (Rosetta Orbiter Spectrometer for Ion and Neutral Analysis) onboard the *Rosetta* spacecraft has measured the coma composition of comet 67P/Churyumov-Gerasimenko with a time resolution sufficient to resolve possible diurnal variations. Measurements were made over several comet rotation periods, covering a wide range of latitudes. These early measurements show large fluctuations in composition in a heterogeneous coma, both in the major and minor volatile species. The observed heterogeneity in the coma may indicate heterogeneity in the nucleus. In addition, ROSINA measured the D/H ratio in the coma of 67P. The results of various ROSINA measurements have implications for the formation conditions of comets, and the origin of water on Earth.

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