

## Europa's sodium atmosphere

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Jupiter's moon Europa is exposed to intense ion and electron flux that erodes the surface, launching atoms and molecules into ballistic trajectories to form a tenuous atmosphere (e.g., Johnson et al., "Jupiter," book, 2004). One component of that atmosphere is neutral atomic sodium, which has been observed many times by Earth-based telescopes (e.g., Leblanc et al., *Icarus*, 2005). When the Cassini spacecraft viewed Europa during an eclipse by Jupiter its visible camera revealed spatially nonuniform emission (Porco et al., *Science*, 2003, Supporting Online Material).

The Cassini eclipse observations were performed with the Narrow Angle Camera (NAC) and clear filters (Porco et al., 2003). Clear filters provide sensitivity to the wavelength range 200-1050 nm, with maximum sensitivity at 611 nm (Porco et al., 2004). Within that wavelength range there are a number of lines that might contribute to the observed glow. These include the electron impact-induced excitation of Na (Kim, *Phys. Rev. A*, 2001), O (Fig. 4 Smyth and Marconi, *Icarus*, 2006), K, and SO<sub>2</sub> (Ajello et al., *J. Geophys. Res.*, 1992). Ions may also make a small contribution to these same processes (e.g., Allen et al., *Phys. Rev. A*, 1988). Of these, electron excitation of Na D line emission is likely the dominant emission in eclipse.

Using an atmospheric model described by Cassidy et al. (2007), we successfully model those emissions by assuming that the Na atoms are ejected preferentially from Europa's trailing hemisphere dark terrain, which may be rich in Na-containing salt hydrates. We will discuss those results and, if available, discuss similar observations by the recent New Horizons Jupiter flyby.