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Abstract

**Europa's Tenuous Atmosphere and its Interaction
with Jupiter's Magnetosphere**

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A first-order description of Jupiter's moon Europa would call it "airless" like our own moon, but, like our moon, Europa has an extremely tenuous atmosphere. Europa's atmosphere is created by the intense flux of ions that erode the water ice surface via the mechanism of electronic sputtering. The ions are accompanied by ~20 eV temperature electrons that are responsible for auroral emissions. An aurora due to electron impact on O₂ was first detected by the Hubble Space Telescope (Hall et al., 1995, where it is called "air glow") and this UV emission from O₂ has been detected many times since (E.g, Hansen et al., 2005). More recently a visible wavelength aurora has been tentatively identified as Na (Cassidy et al., 2008), an atmospheric component which was previously identified via its scattering of sunlight. This new observation seems to show that the Na atmosphere is densest above a spectroscopically-observed "unknown hydrate" that might contain salts from Europa's putative subsurface ocean. Studies of this extremely sparse, nearly nonexistent atmosphere have contributed to the understanding of Europa and its magnetospheric environment, but many basic details are unresolved. I will discuss the history and current state of modeling and observation of this atmosphere.