



Update on the Ion Neutral Mass Spectrometer measurements during the E21 flyby of Enceladus

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We report the ongoing analysis of the Ion Neutral Mass Spectrometer data from the last low-altitude, in situ flyby of the Enceladus spacecraft by the Cassini spacecraft (E21). During previous Cassini flybys of Enceladus, the Ion and Neutral Mass Spectrometer (INMS) detected counts at mass channel 2 in closed source neutral mode that are attributed to H₂. The signal was enhanced at faster flyby velocities as a result of impact-induced chemistry in the antechamber of the instrument, but up to ~15% H₂ was still detected consistently during the slowest flybys. At present, it is unclear if this H₂ is native to the plume or an artifact of high-speed sampling of the H₂O-rich plume. In an attempt to resolve this question, a search for H₂ was performed using the open source neutral beam mode of INMS during the E21 flyby, for which the data are being analyzed. We present the status of this analysis. Furthermore, to assist in the interpretation, we have made three theoretical estimates of how much hydrothermal H₂ could be present for different geochemical/geophysical scenarios, which will also be presented.