Geophysical Research Abstracts
Vol. 20, EGU2018-11320, 2018
EGU General Assembly 2018

Modeling the Complete Set of Cassini's UVIS Occultation Observations of Enceladus Jets

Ganna Portyankina (1), Larry W. Esposito (1), Candice J. Hansen (2), and Klaus-Michael Aye (1)
(1) LASP, University of Colorado, Boulder, CO, USA, (2) Planetary Science Institute, Tucson, AZ, USA

We use a 3D Direct Simulation Monte Carlo (DSMC) model and occultation observations by the UV Imaging Spectrograph (UVIS) on Cassini to study the spatial distribution and relative strengths of active jets emitting from fissures across the southern polar region of Enceladus. Through the mission, UVIS observed Enceladus jets 7 times by taking spectroscopic measurements in its Far UltraViolet (FUV) and High Speed Photometer (HSP) channels while a star or the Sun was occulted by Enceladus' jets. Each observation had a specific geometry and different spatial resolution. At each time step of these observations, the UVIS line of sight crosses multiple jets that possibly erupt from different fissures and thus integrates contributions from multiple sources. We used the model and careful consideration of each of the observational geometries to create a simulated signal from the jets as it would be seen by UVIS. By fitting the modeled signal to the corresponding observation we infer which jet sources contributed to the signal and at what relative strengths. We will present the resulting maps of the active sources. We detect several sources that appear in different UVIS observations over the years and discuss the implications of UVIS observations to understanding the jet sources geometry, production rates, and erupting gas velocities.