

First Light with the EXES Instrument on SOFIA

C. DeWitt (1,2), M. Richter (1), K. Kulas (2), M. McKelvey (2), M. Case (1), W. Vacca (3), M. Clarke (3), T. Encrenaz (4), T. Greathouse (5), G. Harper (6), R. McMurray (2)
(1) University of California Davis, (2) NASA Ames Research Center, (3) USRA/SOFIA NASA Ames, (4) Observatoire Paris-Site de Meudon, (5) Southwest Research Institute, San Antonio, (6) Trinity College Dublin

Abstract

The Echelon Cross Echelle Spectrograph (EXES) successfully carried out its first two flights with the Stratospheric Observatory for Infrared Astronomy (SOFIA) on the nights of April 7 and 9, 2014. EXES is a high-resolution ($R=100,000$) spectrograph that operates from 4.5 to 28.3 microns. Our commissioning targets included a mix of solar system and Galactic objects selected to characterize the performance of EXES onboard SOFIA as well as to provide unique science data.

We present high-resolution spectral maps of Jupiter and Mars observed in the course of our commissioning. Among our scientific highlights, we detected and mapped the 28.3 micron $S(0)$ H_2 line in Jupiter, as well as key transitions of H_2O and HDO over the Martian disk. These wavelengths and spectral lines are unobservable from the ground due to low atmospheric transmission, showcasing the new scientific capabilities enabled by EXES on SOFIA. We discuss the performance and capabilities of EXES for future observations of comets, planets and extra-solar objects.

