Intensity Mapping Studies with SPHEREx

Olivier Dore*[1]

[1]JPL/Caltech – United States

Abstract

SPHEREx, a mission in NASA's Medium Explorer (MIDEX) program selected for launch in February 2019, is an all-sky survey satellite designed to address all three science goals in NASA's astrophysics division, with a single instrument, a wide-field spectral imager. SPHEREx will probe the physics of inflation by measuring non-Gaussianity by studying large-scale structure, surveying a large cosmological volume at low redshifts, complementing high-z surveys optimized to constrain dark energy. The origin of water and biogenic molecules will be investigated in all phases of planetary system formation - from molecular clouds to young stellar systems with protoplanetary disks - by measuring ice absorption spectra. We will chart the origin and history of galaxy formation through a deep survey mapping large-scale spatial power in two deep fields located near the ecliptic poles. Following in the tradition of all-sky missions such as IRAS, COBE and WISE, SPHEREx will be the first all-sky near-infrared spectral survey. SPHEREx will create spectra (0.75 - 4.2 um at R = 41; and 4.2 - 5 um at R = 135) with high sensitivity making background-limited observations using a passively-cooled telescope with a wide field-of-view for large mapping speed. During its two-year mission, SPHEREx will produce four complete all-sky maps that will serve as a rich archive for the astronomy community. I will review the extra-galactic background light measurements and present the prospects for line intensity mapping.

*Speaker