

The Space Infrared Interferometric Telescope (SPIRIT): High-resolution imaging and spectroscopy in the far-infrared

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We report results of a recently-completed study of SPIRIT, a candidate NASA Origins Probe. SPIRIT is a spatial and spectral interferometer with an operating wavelength range 25 - 400 microns. SPIRIT will provide sub-arcsecond resolution images and spectra with resolution $R = 3000$ in a 1 arcmin field of view to accomplish three primary scientific objectives: (1) Learn how planetary systems form from protostellar disks, and how they acquire their chemical organization; (2) Characterize the family of extrasolar planetary systems by imaging the structure in debris disks to understand how and where planets form, and why some planets are ice giants and others are rocky; and (3) Learn how high-redshift galaxies formed and merged to form the present-day population of galaxies. Observations with SPIRIT will be complementary to those of the James Webb Space Telescope and the ground-based Atacama Large Millimeter Array. All three observatories could be operational contemporaneously. SPIRIT will pave the way to the 1 km maximum baseline interferometer known as the Submillimeter Probe of the Evolution of Cosmic Structure (SPECS). In addition to the SPIRIT mission concept, this talk will emphasize the importance of dense u-v plane coverage and describe some of the practical considerations associated with alternative interferometric baseline sampling schemes.