SPECTROSCOPIC CAPIBILITIES AND POSSIBILITIES OF THE FAR INFRARED AND SUBMILLIMTER TELESCOPE MISSION

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The Far Infrared and Submillimeter Telescope (FIRST) mission is the fourth European Space Agency corner stone mission. FIRST will be an observatory with a passively cooled (80 Kelvin) 3.5 meter class telescope and three cryogenic instruments covering the 670 to 80 μm spectral region. The mission is slated for a 4.5 year operational lifetime in an L2 orbit. It will share an Arian 5 launch with PLANCK in early 2007. The three payload instruments include the Spectral and Photometric Imaging Receiver (SPIRE), which is a bolometer array with Martin-Puplett FTS for 200-670 μm, the Photoconductor Array Camera and Spectrometer (PACS), which is a photoconductor array with a grating spectrometer for 80-210 μm and the Heterodyne Instrument for FIRST (HIFI), which is a series of seven heterodyne receivers covering 480-1250 GHz and portions of 1410-1910 GHz and 2400-2700 GHz. FIRST will make many detailed spectral surveys of a wide variety of objects previously obscured by the atmosphere and in regions of the spectrum seldom used for astronomical observations. With all of the spectroscopic capability on FIRST a great deal of laboratory spectroscopic support will be needed for accurate interpretation of the spectral data.