Abstract

NASA’s Origins Space Telescope Mission and Its Synergies with SOFIA

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The Origins Space Telescope (OST) is the mission concept for the Far Infrared Surveyor, a study in development by NASA in preparation for the 2020 Astronomy and Astrophysics Decadal Survey. The science program that has been selected to drive the OST performance requirements is broad, covering four main themes: “Charting the Rise of Metals, Dust, and the First Galaxies”; “Unveiling the Growth of Black Holes and Galaxies Over Cosmic Time”; “Tracing the Signatures of Life and the Ingredients of Habitable Worlds”; and “Characterizing Small Bodies in the Solar System.” The OST telescope itself will have a primary mirror diameter of 8-15 m (depending on the launch vehicle that is selected), will be diffraction-limited at 40µm, and will be actively cooled to approximately 5K. Five science instruments have been base-lined for the observatory: a heterodyne instrument covering 150-500 µm with a spectral resolving power of R~1e7; a low-spectral resolution (R~500) spectrometer covering 35-500 µm; a high-spectral resolution (R~1e5) spectrometer covering 50-500 µm; a far-infrared imager (R~15) covering 35-500µm; and a mid-infrared imager/spectrometer (R~15-500) covering 6-40µm. In addition to having a vastly higher sensitivity than the corresponding SOFIA instrumentation that will allow more detailed follow-up of SOFIA’s discoveries, the OST mission will be configured to provide efficient large-area mapping, which will further complement SOFIA’s science capabilities by providing new targets for study by SOFIA. Furthermore, new SOFIA instruments can provide an excellent testbed for the advanced far-infrared detector technologies what will be required to achieve the anticipated OST performance.