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.