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Abstract Title: **The AstroBiology Explorer (ABE) MIDEX Mission**

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Abstract:

The Astrobiology Explorer (ABE) is a MIDEX mission concept currently under study at NASA's Ames Research Center. ABE will conduct IR spectroscopic observations with much better sensitivity than ISO or SOFIA in order to address outstanding astrobiologically important problems in astrochemistry as well as important astrophysical investigations. The core observational astrobiology program would make fundamental scientific progress in understanding the cosmic history of molecular carbon, the distribution of organic matter in the diffuse interstellar medium, tracing the chemical history of complex organic molecules in the interstellar medium, and the evolution of organic ices in young planetary systems. The ABE instrument concept includes a 0.5m aperture Cassegrain telescope and a suite of three moderate resolution (R=1000-4000) spectrographs which cover the entire 2.5-20 micron spectral region. Use of large format (1024x1024 pixel or larger) IR detector arrays will allow each spectrograph to cover an entire octave of spectral range per exposure without any moving parts. The telescope is passively cooled by a sun shade to below 65K, and the detectors are cooled with solid H₂ cryogen to approximately 8K. ABE will be placed in an Earth-trailing 1 AU solar orbit by a Delta II launch vehicle. This energetically favorable orbit provides a low thermal background, affords good access to the entire sky over the 1 year mission lifetime, and allows adequate communications bandwidth. The spacecraft will be stabilized in 3 axes and will be pointed to an accuracy of approximately 1 arcsecond at ABE's several thousand individual scientific targets.

Key Words: Astrobiology, Infrared, Spectrometer, telescope, MIDEX