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Strategies for Rapid Implementation of Interstellar Missions: Precursors and Beyond (4)

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NEAR-TERM INTERSTELLAR PROBE: FIRST STEP

Abstract

Exploration of the heliosphere and the far reaches of our solar system by the Voyagers and New Horizons and near-Earth observations of the Kuiper Belt and exoplanetary systems have all profoundly changed how we view our own home in space. An Interstellar Probe escaping beyond the solar-system boundaries with new observational techniques would be a bold move in space exploration, enabling detailed, new understanding of the global heliosphere in the context of other astrospheres, further discoveries of unexplored Kuiper Belt Objects, and the first observations of our circumsolar dust disk. These would offer insight into the evolution of the solar system and our understanding of exoplanetary systems. With the power supplies on the Voyagers nearing their end of life, the rapid pace of discovery of exoplanets in other stellar systems, and the evolution in our own understanding brought about by results from the Voyager, Cassini, and Interstellar Boundary Explorer (IBEX) spacecraft, the time is right for looking at the next steps we can make into our stellar neighborhood. The question facing us today is what the appropriate next step - a true first step - is in negotiating the transition from science fiction to engineer-

ing reality. The scientific imperatives associated with reaching the near interstellar medium in order to understand our origins and our own current locale in the Milky Way trace to the beginnings of the Space Age, and they have been debated and refined since that time and into the current epoch. The subjects of interstellar travel, interstellar probes, and interstellar "precursor" missions are not new but have lacked traction with policy makers and the scientific community at large because of the states of both scientific knowledge and engineering realities. The next step in reaching to the stars will require the recognition of engineering limits, scientific trades, and scientific compromises, but this is new neither in science nor exploration. Such a step would be an "Interstellar Probe." The time for that step has come.