

Researching the Planetary Environment with an Interstellar Probe

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In 2018, a study originated with the idea of a mission that would be feasible to launch in the 2030s, targeting 1000 AU within 50 years using current technology. While the primary objective of such an Interstellar Probe would be to understand the heliosphere and interstellar medium, this probe offers an excellent opportunity for rock, dust, and ice sciences. In the initial stages of its journey through the solar system, this Interstellar Probe would carry out a wide range of potential observations to study the planetary environment, particularly focusing on dust/ice analysis and planetary science through fly-bys of critical science targets, especially in the trans-Neptunian region. A flyby of a trans-Neptunian dwarf planet, such as Quaoar, would provide further geological, compositional, and geophysical context for Earth-based observations. Aside from in-situ remote sensing techniques, VISIR and dust analyses would also benefit in this region of the solar system to determine (i) dominant ice and dust compositions and potential variations depending on heliocentric distance (e.g., chemical or irradiated products); (ii) collections and identification of PAH-type components; and (iii) solar nebula chemical and mechanical processing, such as collisions. The purpose of our poster is to provide a background of the Interstellar Probe's objectives and possible instrumentation to offer insight on current questions about the planetary environment.