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

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HIGH-SPEED MAGNETIC-SAIL INTERSTELLAR PRECURSOR MISSIONS ENABLED BY
METASTABLE METALLIC HYDROGEN

Abstract

The recent observation of metallic hydrogen in high-pressure diamond anvil experiments raises the prospect of superconducting metastable metallic hydrogen. With a critical temperature close to near Earth orbit temperatures (300-400 K), superconducting metallic hydrogen, developed in bulk amounts would simplify the production and launching of magnetic-sail propelled interstellar precursor missions. At cruising speeds of 300-600 km/s these would propel high-speed missions to the Sun's gravitational focus at 750 AU and to the hypothesised Ninth Planet at 1000 AU. A magnetic-sail might also act as a brake against the Local Interstellar Medium (LISM), enabling orbital missions to the Ninth Planet.