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(A7)Science Goals and Drivers for Future Exoplanet, Space Astronomy, Physics, and Outer Solar System  
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## EXPLORING THE KUIPER BELT WITH SUN-DIVING SOLAR SAILS

**Abstract**

The Kuiper Belt is a disc-shaped region extending 35-50 AU from the Sun that is populated by volatile-rich objects including the dwarf planet Pluto and > 100,000 bodies larger than 100 kilometers across and as many as a trillion smaller comets. After the discovery of Pluto in 1930, the next discovery of a Kuiper Belt Object (KBO) was in 1992. The NASA New Horizons Probe encountered Pluto and its satellites in 2015 and is in route to a second Kuiper Belt destination [1]. It is possible to survey many Kuiper Belt Objects (KBOs) using a single launch. Many wafer-scale spacecraft, each equipped with solar sails, could be unfurled from a single interplanetary bus at the perihelion of that craft's solar orbit. Each wafer-scale spacecraft would carry a scientific payload and would be directed to intersect one or more KBOs. Perihelion temperature effects and trajectory corrections necessary to overcome warped space-time in the Sun's gravity well are calculated follow Refs. [2] and [3], respectively. The proposed scenario is the following: the sails are carried as a payload to a relatively small heliocentric distance (0.1 - 0.2 AU); once at the perihelion, the sails are deployed. Besides electromagnetic propulsion due to the solar radiation, another mechanism could be convenient: thermal desorption, a physical process of mass loss which can provide additional thrust as heating liberates atoms, embedded on the surface of a solar sail [4,5]. Therefore, sails experience additional propulsive force due to the thermal desorption.

## References:

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