

4-season's optical observation of neutral helium distribution in interplanetary space by Hisaki

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The Hisaki (SPRINT-A) satellite has a main scientific topic of the planetary magnetospheric physics and atmospheric evolution by long-term observations, but also carried out an observation of helium atom resonance scattering from interplanetary space. A material in the interstellar medium (ISM) travels into the heliosphere over the heliopause due to the relative velocity between the heliosphere and interstellar gases. The helium atoms move into the heliosphere from the sun without ionizing because of its high ionization energy. The helium atoms are bent by sun gravity along the Keplerian orbit and forms a high density region on the down wind side, which is called helium cone. The distribution of helium atoms in the helium cone can estimate the speed and direction of the interstellar wind, and the density and the temperature of the helium atom in interstellar gases. This study was carried out from the 1970s, but the interplanetary helium atoms observation is one of powerful tools to recognize the interstellar medium from inside the heliosphere. The Hisaki satellite carried out the observation of the resonance scattering from inside the helium cone during November and December. The interstellar parameters derived from The Hisaki's observation results of the helium cone four times in years of 2015 - 2018 are reported.

Keywords: EUV spectral observation, Interstellar wind and gas, Interplanetary neutral helium, HISAKI satellite