

## 5-season's optical observations of neutral helium distribution in interplanetary space by Hisaki

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The Hisaki (SPRINT-A) satellite has main scientific objectives of the planetary magnetospheric physics and atmospheric evolution by long-term observations, but also carried out an observation of helium atom resonance scattering in 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 neighboring 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 has been 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 in the helium cone during November and December from 2015 to 2019 five times. The interstellar wind direction derived from the comparison between the observation and the model simulation coincide the results of the other satellite observation. It means that the interstellar wind is stable in these years.

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