

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 continuous observation for a long term, but carried out the non-planet observation at the time when no planet during a good observation opportunity phase exists. One case of those is observation of helium atom resonance scattering from the interplanetary space.

The interstellar wind flows into the heliosphere over the heliopause by the relative velocity of the heliosphere and the interstellar medium. The helium atom can travel into about 0.5Au from the neighboring of the sun without ionizing because of its high ionization energy. The travelling orbit is bent by sun gravity and forms a high density region on the downwind side. It 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 space. Such a study was carried out from the 1970s.

Recently the study of interstellar space is one of interesting topics owing to the IBEX satellite observation results. Frisch (2013) shows that the interstellar wind direction gradually changes for this several decades. However, it is shown that the direction is stable from the re-analysis of the IBEX observation (Mebius et al., 2015) and the hydrogen scattering emission distribution observed by SOHO/SWAN (Koutroumpa et al., 2017).

The Hisaki satellite carried out the optical observation of the resonance scattering from helium cone. It is a different method from the IBEX and SOHO observations and it is important to confirm the interplanetary helium distribution continuously. In 2015 and 2016 seasons, Hisaki observed the helium cone including a ecliptic longitude with the maximum density of the helium. In this presentation, the helium cone observation results are reported and it is discussed whether the change of the wind direction or not.

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