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Helically moving HI cloud found in the outer Galactic diskHiroyuki Nakanishi¹, Naomi McClure-Griffiths², Mami Machida³, Chey Saita¹ (¹Kagoshima University, ²Australian National University, ³Kyushu University)

We report that a helically moving HI cloud is found in the outer Galactic disk using Galactic All Sky Survey (GASS) data obtained with Parkes 64m telescope and Southern Galactic Plane Survey (SGPS) data obtained with Australia Telescope Compact Array (ATCA). The HI cloud is located in the direction of $(l, b) = (278 - 282^\circ, 1^\circ)$ and in the velocity range of 88–108 km s⁻¹. If the foot points of the loop are assumed to rotate following the global Galactic rotation curve around the Galactic center, distance of the HI cloud is estimated to be 12.1–13.9 kpc from the Sun and the Galactocentric distance is 13.0–15.0 kpc. The total length and width are estimated to be 2kpc and 60 pc, respectively. The mass of the cloud is calculated to be $2 \times 10^3 M_\odot$.

A channel map of the cloud shows that the cloud feature repeats proceeding and stopping channel by channel as if a inchworm moves. We show that this kinematic feature can be easily explained with a toy model assuming that the cloud is a magnetically floated strand and moves along the surface of a tube. A value of gas pressure is found to be comparable with magnetic pressure, which supports the magnetic floatation model. The existence of the helically moving HI cloud can be an evidence of magnetic floatation caused by Parker instability which is believed to occur if the Galactic dynamo works.