Geophysical Research Abstracts
Vol. 16, EGU2014-8861-1, 2014
EGU General Assembly 2014

Ion cyclotron wave storms in the solar wind: constraint on source region

Lan Jian (1,2), Hanying Wei (3), Christopher Russell (3), Janet Luhmann (4), and Xochitl Blanco-Cano (5)

(1) NASA, (2) University of Maryland, College Park, (3) University of California, Los Angeles, Institute of Geophysics and Planetary Physics, Los Angeles, United States, (4) University of California, Berkeley, (5) National Autonomous University of Mexico

Ion cyclotron waves have been observed in the solar wind at several heliocentric distances. Statistical study on these waves shows that they are probably generated in the solar corona and carried outward by the solar wind. Among these ion cyclotron wave observations, there is a special group of events in which waves last for over half an hour (called ICW storms) and have co-existing right-handed and left-handed waves. These waves have the properties expected for left-handed in the solar wind frame but are Doppler-shifted in the spacecraft frame, with Sunward-propagating waves shifted to higher frequency, and anti-Sunward-propagating waves shifted to lower frequency or even reversed in polarity. Assuming both left-handed and right-handed waves are generated by pickup ion at same location, we estimate the pickup ion's initial velocity is typically one third of the solar wind velocity and three times the Alfven velocity. We also use the wave frequency to find the source region of these waves and compare with hybrid simulation results.