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Oral
(Student Speaker)
Plasma waves are crucial to the processes of plasma heating and energy transfer. The in-situ observation of Alfven ion cyclotron (AIC) waves and their properties within interplanetary coronal mass ejection (ICME) flux ropes are covered in this article. We examined 401 ICME flux ropes that the WIND satellite observed at 1 au between 1995 and 2021. Only five ICME flux ropes explicitly displaying AIC waves were discovered; two have normalized magnetic helicity of ?m > 0.5, and the other three exhibit ?m > 0.5 polarization. For ?m <0.5, the angle between the magnetic field and velocity (?vB) is 40°, whereas for ?m? 0.5, ?vB > 140°. This finding confirms the presence of left-handed polarised AIC waves that are quasi-parallel and quasi-antiparallel within ICME flux-ropes. We propose that (i) proton temperature anisotropy T p/T p > 1 driven by cyclotron instability and (ii) low-frequency Alfv en waves via the magnetohydrodynamic turbulent cascade may be the sources of AIC waves. This work demonstrates that the ICME flux rope indicates fluid and kinetic scale coupling.
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