

Pseudo-magnetic flux rope and Alfvén wave

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Interplanetary magnetic flux ropes are characterized by the rotation of magnetic field vectors. They are also characterized by stronger magnetic fields in comparison with the surrounding fields, and low proton temperatures. We surveyed the solar wind data from ACE for such structures which exhibit magnetic field rotations, and found some unusual events that exhibit rotations of magnetic field vectors similar to those observed in the magnetic flux ropes, while the magnetic field intensities and the proton temperatures are comparable to those in the surrounding regions. A pronounced characteristic of such events is an Alfvénic nature, with a parallel or anti-parallel relationship between the velocity and magnetic field vectors. Here, we call such regions a pseudo-magnetic flux rope. It is shown that the pseudo-magnetic flux rope can be explained by the passage of spacecraft through a region where the rotational Alfvén wave is propagating.