Multi-spacecraft observation of interplanetary coronal mass ejections

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Understanding the overall structure of an interplanetary coronal mass ejection (ICME) on the basis of a single spacecraft observation is often difficult. It is useful to use two or more spacecraft which are separated by a distance comparable to the typical scale of the structure. A successful example is a torus-shaped magnetic flux rope determined from observations made by NOZOMI and ACE separated by 0.2 AU in the direction of the solar wind stream. Another example is a sheath structure preceding an ICME, in which large-amplitude magnetic fluctuations are observed to propagate outward. In this paper, the formation of a planar magnetic structure from the Alfvenic fluctuations ahead of an ICME will be discussed.