

Cluster observations of high-beta plasma blobs in the magnetosheath

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We use Cluster multi-point measurements to identify localized plasma blobs with a higher density than the background plasma. Several criteria are used to discriminate between blobs convecting together with the plasma flow from signatures associated with motion of the magnetopause or bow shock. Having identified such plasma blobs, we determine their geometry along and perpendicular to the plasma flow. The dynamic beta value (the ratio of the kinetic and magnetic energy densities) and ratio of the scale size perpendicular to the flow to the ion gyro radius are critical parameters for determining the penetrations of such blobs into the magnetosphere during impulsive penetration events. Determination of these parameters enables a comparison with theoretical and laboratory results, showing if typical plasma blobs can penetrate into the magnetosphere, and what type of penetration mechanism will be likely.