



## **Impulsively penetrating magnetosheath plasma elements: validation tests derived from 2D kinetic modeling**

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CLUSTER measurements in the magnetosheath provide evidence of plasma elements having macroscopic properties (density, bulk velocity, temperature) significantly different from the background plasma flow. This type of plasma structures can interact with the magnetopause and move inside the magnetosphere as suggested by the impulsive penetration model. Starting from a two-dimensional, kinetic description of stationary sheared flows of non- and high-diamagnetic plasma jets/plasmoids/blobs I provide a series of validation tests that can be checked against data. I describe the spatial scaling of the boundary layers forming at the edges of plasma elements and how they relate to electron and ion gyroradius. I also describe the spatial variations of the density, velocity, E-field and B-field and the transition between values typical for the plasma elements to background values. I discuss also the microscopic structure of the edges of plasma elements. Velocity distribution functions for both electrons and protons, inside the jet/blob, at the edges and inside the background plasma, are also provided.