



Statistical survey of the terrestrial bow shock current system using Cluster observations

Evelyn Liebert, Christian Nabert, and Karl-Heinz Glassmeier

Universität Braunschweig, Institut für Geophysik und extraterrestrische Physik, Braunschweig, Germany (e.liebert@tu-bs.de)

The Cluster spacecraft provide unique 3-D measurements of the magnetic field at the Earth's bow shock. Applying the Curlometer analysis method to the observed spatial gradients of the magnetic field leads to a direct estimation of current densities and directions based on Ampere's law. We carry out the first comprehensive statistical investigation of the bow shock current system based on a large number of Cluster bow shock crossings both at the quasi-perpendicular and the quasi-parallel shock during arbitrary IMF configurations. Current properties at quasi-perpendicular shock geometries are in good accordance to theory and existing simulations. In contrast to that, currents observed at quasi-parallel shocks and next to the foreshock region feature distinct variations in direction.