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Searching wave source locations using Cluster data

O.D. Constantinescu (1,2), K.-H. Glassmeier (1), K.-H. Fornaçon (1) and R. Treumann (3)

(1) Institut für Geophysik und Extraterrestrische Physik, Braunschweig, Germany, (2) Institute for Space Sciences, Bucharest, Romania, (3) Institut für Extraterrestrische Physik, Garching, Germany

We present a method which can be used for finding the position of wave sources under the assumption of spherical waves using multi-spacecraft measurements of the magnetic field.

The approach is closely related with the wave telescope technique used for determining the k-vector for plane waves. The method consist in computing the array gain (power) in different points in space. The array gain is constructed as a combination between the measurements and weighs representing a test wave. The power maximizes when the test wave is close to the wave which is actually measured.

We use synthetic data with various number of sources and different parameters (noise, frequency, relative power, etc) in order to test the method. We also study the influence of the number of sensors and of their configuration on the accuracy of the method.

Preliminary results of source determination using Cluster magnetic data are presented.