



## **A four points study of the evolution of the magnetic field in the inner magnetosphere and of the limitation of the curlometer technique.**

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The curlometer technique allows calculating the current density from the magnetic field measured at four different positions inside a given current sheet using the Maxwell-Ampere's law. In 2009 the CLUSTER perigee pass was located at about 2 RE allowing a study of the ring current deep inside the inner magnetosphere. The curlometer has been applied in such an orbit to calculate the current density from measured and modelled magnetic fields and for different sizes of the tetrahedron. The results showed that the current density cannot be calculated using the curlometer technique at low altitude perigee pass. It also demonstrates that the parameters used to estimate the accuracy of the method are necessary conditions but not sufficient ones. In this paper, we present a study of the evolution of the magnetic field in the inner magnetosphere as seen by the four CLUSTER satellites along a low perigee pass orbit. The purpose of the study is to define how to change the curlometer technique in order to make it usable in regions where the magnetic field spatial evolution scale is much more greater than the size of the constellation tetrahedron.