



Contribution ID: 4

Type: **not specified**

Force Free Electrodynamics in a Black Hole Background

Tuesday, 12 September 2017 09:30 (45 minutes)

In Nature there are several astrophysical systems surrounded by a magnetosphere with a plasma that can be described using the so-called force-free electrodynamics (FFE). This is the case for example of black hole magnetospheres. By analyzing the stationary axisymmetric magnetosphere surrounding a spinning black hole, Blandford and Znajek realized that one could extract energy from a rotating black hole: the Blandford and Znajek mechanism. By studying in detail the Blandford and Znajek monopole solution we find however that its validity breaks down before reaching the asymptotic region. Motivated by this result, we investigate a new approach to find a solution of FFE equations which is valid everywhere.

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