

Classical and Quantum Gravity 2007 vol.24 N20, pages 5221-5245

Magnetic relaxation in the Bianchi-I universe

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Abstract

The extended Einstein-Maxwell model and its application to the problem of the evolution of the magnetized Bianchi-I universe are considered. The evolution of medium magnetization is governed by a relaxation type extended constitutive equation. The series of exact solutions to the extended master equations is obtained and discussed. The anisotropic expansion of the Bianchi-I universe is shown to become non-monotonic (accelerated/decelerated) in both principal directions (along the magnetic field and orthogonal to it). A specific type of expansion, the so-called evolution with hidden magnetic field, is shown to appear when the magnetization effectively screens the magnetic field and the latter disappears from the equations for the gravitational field. © 2007 IOP Publishing Ltd.

<http://dx.doi.org/10.1088/0264-9381/24/20/018>
