



عنوان البحث

The Time Evolution of a Slightly Non-Ideal Neutral Plasma

لتطور الزمني للبلازما غير المثالية ذات المعاوقة متناهية الصغر والمتعادلة كهربياً

2- البيانات الخاصة بالنشر

Egyptian Journal of Physics (Egpyt. J. Phys.)	إسم المجلة
يناير 1999	تاريخ النشر
30 (1); pp. 71-77	المجلد
دراسة نظرية	منهجية البحث

4- ملخص البحث باللغة الإنجليزية

The concept of a slightly non-ideal plasma was first introduced by J.B.Taylor in the context of his famous theory on plasma relaxation in the following sense: a slightly non-ideal plasma relaxes toward a state of minimum magnetic energy under the constraint that the global magnetic helicity integral and the total toroidal magnetic flux remains conserved. Based on a multiple time-scale derivative expansion scheme, we have shown in a previous work, that Taylor's conjecture is indeed true on the MHD-collision time-scale (CMHD). In this paper, the invariance properties of both the local and the global mass integrals on the ideal MHD (IMHD) and (CMHD) time-scales. On the IMHD time-scale, it is shown that both the local and the global mass integral is no longer conserved while, on account of the motion of the particles across the magnetic field lines, the global mass integral is only conserved.