



1- بيانات البحث

عنوان البحث

Turbulent Dynamo and Magnetic Helicity Transport in Strongly Magnetized, Collisionless Fusion Plasmas

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2- البيانات الخاصة بالنشر

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4- ملخص البحث باللغة الإنجليزية

Based on a multiple time scales approach, the time evolution of the total magnetic helicity on the resistive diffusion time scale (RDMHD) has been derived. It was shown that for the case of strongly magnetized, collisionless fusion plasmas, dynamo α -effect is merely due to MHD mechanism in consistent with the experimental measurements which have been detected in reversed field pinch (RFP) plasmas. Furthermore, It was emphasized that the effect of turbulent dynamos on magnetic helicity transport depends critically on the nature of the turbulence. When the turbulence is electromagnetic, the dynamo α -effect converts helicity from turbulent, small-scale field to mean, large-scale field. When the turbulence is electrostatic the dynamo α -effect transports the mean field helicity across space without



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dissipation. In all cases, it was shown that on the resistive time scale, the α -effect conserves the total magnetic helicity against the resistive effect, the result which explains the long discharge time of the reversed field pinch (RFP).