ON THE DAMPING OF TURBULENT MOTIONS BY A MAGNETIC FIELD IN AN ELECTRICALLY CONDUCTING MEDIUM*

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Abstract: This paper deals with turbulent motions in a homogeneous, electrically conducting medium in the presence of a large-scale magnetic field which is on the average homogeneous and stationary. It is assumed that the interaction between the motion and the magnetic field is weak. A method is developed for calculating the deviation of the pair correlation tensor of the velocity field from that occurring in a zero magnetic field. As an example, the pair correlation tensor for a homogeneous stationary turbulence which is isotropic and mirror-symmetric for a zero magnetic field, is determined. It is shown that the turbulent velocity is reduced by the magnetic field, the component parallel to the field, however, less than those perpendicular to it. In addition, the correlation length, parallel to the field, turns out to be larger than the one perpendicular to it, indicating a tendency towards two-dimensional motion. Winthin the scope of those results, the structure of the turbulent motions on the Sun are discussed.

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