

On statistics of a plasma in a nonuniform flow

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It is well known that energetic particles such as cosmic rays can efficiently be accelerated by scatterers convected by a compressional flow (Fermi acceleration). Scatterers convected by an expanding flow decelerate the particles, but this is not the reverse process of the acceleration. Plasma in space is never uniform, but is rather composed of different plasmas with different propagation speeds. We analyze statistics of energetic particles in such nonuniform plasma flow analytically and numerically. Results will be compared with non-equilibrium plasma distributions in the solar wind.

Keywords: Fermi acceleration, Nonequilibrium distribution