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Sheath characteristics in collisional magnetized plasma with nonextensive electrons and thermal ions

M Mohammadnejad* and A Arghand-Hesar

Department of Physics, Faculty of Basic Sciences, Azarbaijan Shahid Madani University, Tabriz, Iran

E-mail: mohammadnezhad@azaruniv.ac.ir

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Abstract

Sheath formation and its characteristics are studied in collisional magnetized plasma consisting of nonextensive electrons and thermal ions. Using two-fluid model, the Bohm criterion for ion velocity is deduced as a function of plasma parameters and shown that ion-neutral collisions impose an upper limit for the Bohm criterion. It is also found that deviation from the standard Maxwellian distribution significantly affects the sheath characteristics. Sheath potential and ion density are considered under the effects of magnetic field, ion temperature, nonextensivity and ion-neutral collision frequency. The results indicate that by applying an external magnetic field, it is possible to control the sheath thickness.

Keywords: plasma sheath, magnetized plasma, Bohm criterion, nonextensivity, thermal ions

For full article, refer to the Persian section