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Electrodynamics of axion-active system: polarization and stratification of plasma in an axionic dyon magnetosphere.

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The state of a static spherically symmetric relativistic axionically active multi-component plasma in the gravitational, magnetic and electric fields of an axionic dyon is studied in the framework of the Einstein - Maxwell - Boltzmann - axion theory. We assume that the equations of axion electrodynamics, the covariant relativistic kinetic equations, and the equation for the axion field with modified Higgs-type potential are nonlinearly coupled; the gravitational field in the dyon exterior is assumed to be fixed and to be of the Reissner-Nordstrom type. We introduce the extended Lorentz force, which acts on the particles in the axionically active plasma, and analyze the consequences of this generalization. The analysis of exact solutions, obtained in the framework of this model for the relativistic Boltzmann electron-ion and electron-positron plasmas, as well as, for degenerated zero-temperature electron gas, shows that the phenomena of polarization and stratification can appear in plasma, attracting the attention to the axionic analog of the known Pannekoek-Rosseland effect.

[1] Pannekoek, A.: 1922, Bull. Astron. Inst. Neth. 1, 107-118.

[2] Rosseland, S.: 1924, Monthly Notices Roy. Astron. Soc. 84, 720-728.

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