

Dust structure rotation under the magnetic field influence in the region of narrowing of the glow discharge current channel

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At the previous Elbrus conference in 2023, we have shown that in a glow discharge, the dust particle rotation under the magnetic field influence, associated with the neutral gas drag, can be significant not only in the striations, but also inside the insert that narrows the current channel. It was previously assumed that only the ion drag is important in this region. In this communication, we propose a simple computational model and show that it is the neutral gas drag may be responsible for the ultra-fast rotation of the dust particle structure in this region of glow discharge in magnetic fields $B \gtrsim 1$ T with angular velocities of $\Omega \sim 10^2$ rad/s. It should be noted that in this discharge region both rotation mechanisms, ion and neutral gas drags operate in the same direction, therefore, unlike the striation, rotation inversion does not occur here.