Spin of dust particles in magnetic field [[1]](#footnote-1)\*)

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The charged dust particles rotating around the center of inertia have magnetic moments, which determine the magnetic properties of the complex plasma. The work studies the mechanical state of dust tops when the external magnetic field is imposed. A range of magnetic field corresponds to electron magnetization.

Angular rotation velocity is measured by the coordinate tracing method developed by the authors. The experiment is carried out under conditions of glow discharge with hollow transparent particles with the sizes from 5 to 60 mkm in several inert gases, where masses of ions differ by an order of magnitude.

The particles spin appears in the absence of magnetic field. Observations show that the magnetic field does not change the magnitude of the angular velocity of the particle 's spin, although the calculation of the ion impulsive moment and a number of literary models predict an increase in the magnitude of the angular velocity up to 106 rad/s. This "paradoxical" result is related to the compensation of ionic and electronic mechanical moments acquired in the magnetic field in the process of maintaining of the stationary charge and transmitted to the dust particle.

The measured values allow for the first time to estimate the magnetic properties of the complex plasma. Its magnetic susceptibility exhibits an extremely small value on the order of 10-9. The magnitude and direction of the magnetic moments of the dust subsystem indicates its paramagnetic properties.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/Lt/ru/EN-Karasev.docx) [↑](#footnote-ref-1)