

Abstract Submitted
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Non-Gaussian Velocity Distribution of Microparticles in Plasma under Microgravity Conditions AMIT K. MUKHOPADHYAY, J. GOREE, BIN LIU, University of Iowa, V.E. FORTOV, A.M. LIPAEV, V.I. MOLOTKOV, O.F. PETROV, JIHT, Russian Academy of Sciences, 127412 Moscow, Russia, G.E. MORFILL, H.M. THOMAS, A.V. IVLEV, Max-Planck-Institut für extraterrestrische Physik, 85748 Garching, Germany — In an experiment performed on the International Space Station using the PK-3 Plus instrument, 3.4-micron plastic microparticles were introduced in a neon glow-discharge plasma. The microparticles became negatively charged and were confined by ambipolar electric fields. Using laser illumination and video cameras, microparticles were imaged and their motions tracked using image analysis software. We calculate the velocity distribution function $f(v)$ for the random motion. We find that $f(v)$ is non-Maxwellian with an elongated high-energy tail for this non-equilibrium system and $f(v)$ is fit well by the Tsallis distribution. This distribution is popular in the field of statistical physics for non-equilibrium systems. Work in Iowa was supported by NASA grant NNX07AD22G. Work in Germany was supported by DLR/BMWi grant no 50WP0203 and by RFBR grant no. 06 02 08100.

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