

# Anisotropic linear structures of active Brownian particles depending on external parameters in DC discharge

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Active Brownian particles are extremely widespread and can be met in systems of diverse complexity and scale. Active colloidal particles exhibit collective behavior and may self-organize in various types of structures in different environments: liquid, gas and plasma [1]. Dynamic and morphological characteristics of such systems are dependent on external parameters [2].

Presented experimental results of investigation of an anisotropic linear structure of active Brownian particles in dependency on external parameters in DC discharge. The structure formed by 10 polydisperse CeO<sub>2</sub> particles. During the experiment the discharge current was varied from 0.75 mA to 2.5 mA, the pressure of buffer gas was varied from 30 mTorr to 45 mTorr.

According to obtained data were reconstructed the particles' trajectories and calculated its average mean square displacements, kinetic energies, interparticle distance and deviation from axis of a structure. The dependencies on pressure and discharge current were investigated. This research was supported by the Russian Science Foundation (RSF), grant No. 25-12-00406

[1] Bechinger C, Di Leonardo R, Löwen H, Reichhardt C, Volpe G and Volpe G 2016 *Rev. Mod. Phys.* **88**(4) 045006

[2] Fedoseev A, Litvinenko V, Vasilieva E, Vasiliev M and Petrov O 2024 *Scientific Reports* **14** 13252