Contribution ID: **14** Type: **oral**

Switching of wake-mediated interaction caused by blockade effect and collective wake formation

Wednesday, 6 September 2017 12:15 (15 minutes)

The effect of concentration-dependent switching of the wake-mediated interaction between obstacles in a gas flow of interacting Brownian particles is presented. When increasing bath fraction exceeds half-filling, the interaction between obstacles switches from effective attraction to repulsion or vice-versa, depending on the mutual alignment of obstacles with respect to the gas flow. It is shown that for an ensemble of small and widely separated obstacles the dissipative interaction takes the form of induced dipole-dipole interaction governed by an anisotropic screened Coulomb-like potential. This allows one to give a qualitative picture of the interaction between obstacles and explain switching effect as a result of changes of anisotropy direction. The non-linear blockade effect is shown to be essential near closely located obstacles, that manifests itself in the additional screening of gas flow and generation of a pronounced step-like profile of gas density distribution. It is established that behavior of the magnitude of dissipative effective interaction is, generally, non-monotonic in relation to both the bath fraction and the external driving field. It has characteristic peaks corresponding to the situation when the common density "coat" formed around the obstacles is most pronounced. The possibility of the dissipative pairing effect and the effects of enhanced shock-wave formation of wake profiles under the collective scattering of gas flow on impurities are discussed. All the results are obtained within the classical lattice-gas model.

Primary authors: KLIUSHNYCHENKO, Oleksandr (Institute of Physics, NASU, Kiev, Ukraine); LUKYANETS, Sergey (Institute of Physics, NASU, Kiev, Ukraine)

Presenter: KLIUSHNYCHENKO, Oleksandr (Institute of Physics, NASU, Kiev, Ukraine)

Session Classification: Session 9