КОЛОКВИУМ „АЛЕКСЕЙ ШЕЛУДКО”
СЕКЦИЯ „ПОВЪРХНОСТИ И КОЛОИДИ”
ИНСТИТУТ ПО ФИЗИКОХИМИЯ НА БАН

С Ъ О Б Щ Е Н И Е

На **6 декември 2019 г. (петък) от 11:00 часа в зала “Болцман” на ИФХ-БАН,** ще се проведе заседание на Колоквиума със следния дневен ред:

1. Доклад на Любомир Николов на тема:

“ HYDRODYNAMIC BOUNDARY LAYERS AT SOLID WALL – A TOOL FOR SEPARATION OF FINE SOLIDS “

The hydrodynamic interactions of fine solids with hydrodynamic boundary layers (BL) often result in entrapment of these species in the vicinity of mobile or solid interfaces. In the case of neutrally buoyant particles these might result in granulometric classification within the BL region. The details have been elucidated for the case of BL on rising bubbles and the effects on flotation type separation have been discussed [1]. The key factor proved to be the relative sizes of the particles as compared to the BL scaling lengths. If the particles are non-buoyant, the gravity effects additionally modify the entrapment effects [2]. Here we present the analysis of the hydrodynamic interactions of fine (micron sized) non-neutrally buoyant particles with background BL flow at a solid wall. From application point of view the most interesting data concern the cases of particles that are detained within the BL region: (i) small-sized solids (Rp<L/ReL5/4, ReL is Reynolds number of the BL); (ii) light solids (Δρ/ρ<Fr2/ReL1/2, Fr is the Froude number, Δρ/ρ is the relative particle density). The particle capture in these two cases results in a significant amplification of the entrapment near the wall. These obtained results have to be accounted for in the in the assessment of the recovery of fine species from ground materials. They should be incorporated in the appraisal of the overall capture efficiency for fine particles in industrial separation processes.

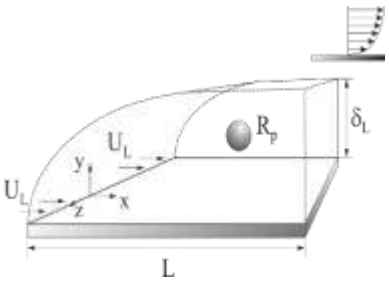

Figure 1. A particle with finite dimension R_p in BL at a solid plate

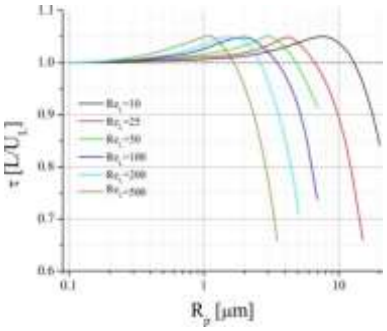

Figure 2. Distribution of particle’s residence time (τ) vs. R_p within a BL

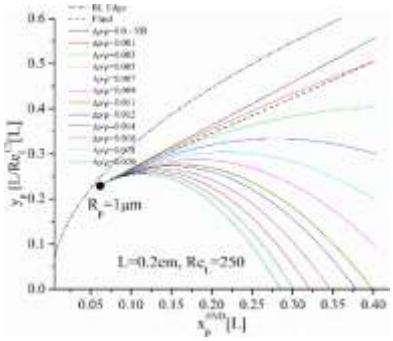

Figure 3. Deviations of particle’s trajectories toward the solid wall at different particle densities ($\Delta\rho/\rho$)

References:

1. E. Mileva, L. Nikolov, “Entrapment efficiencies of hydrodynamic boundary layers on rising bubbles”, *J. Coll. Interface Sci.* 265 (2003) 310-319.
2. L. Nikolov, “Hydrodynamic boundary layer at a rising air bubble and entrapment of fine solids: Gravity effects on particle–bubble interactions”, *J. Disp. Sci. & Technol.* 39 (3) (2018) 341-348