

**Report on the activities of Pawel Bryk during his visit to  
the Institute of Condensed Matter of Ukrainian Academy of Sciences in Lviv.  
The visit took place between 8 February and 8 March of 2012.**

During my stay in Lviv I carried out various scientific as well as teaching/learning activities together with members of the group of Prof. A. Trokhymchuk and Prof. J. Ilnytskyi and Dr. T. Patsahan

Scientific activities:

During my stay in Lviv together with prof. J. Ilnytskyi I developed a dissipative particle Dynamics program for studying flow in confined systems. The simulational setup consists of parallelepiped box with walls covered by polymer brush. The brush is in contact with phase-separating binary mixture as a solvent. It is known that in equilibrium such systems tend to develop various mesoscopic structures such as lamellar phases or pillars. We find that for Poiseuille flow the pillar morphology is quite unstable and tends to change to the lamellar morphology. Details of the calculations will be presented in a paper that is currently being prepared for submission.

Teaching/learning (transfer of knowledge) activities:

During my stay (08.02-08.03.2012) I gave a series of three lectures on classical density functional theory for simple and polymeric fluids. In addition I carried out several scientific discussions with Prof. J. Ilnytskyi regarding implementation of the dissipative particle dynamics program under non-equilibrium condition. With Dr. T. Patsahan I discussed the problem of methods of effective implementation of parallelisation of molecular-dynamics algorithms for distributed memory model multiprocessor systems.