ОБЪЕДИНЕННЫЙ ИНСТИТУТ ЯДЕРНЫХ ИССЛЕДОВАНИЙ
Лаборатория теоретической физики им. Н. Н. Боголюбова

Семинар
«МАЛОЧАСТИЧНЫЕ СИСТЕМЫ»
вторник, 14 октября 2014 г., 11:00
аудитория им. Д.И.Блохинцева (IV этаж)

TRANSFER PROCESSES IN PROTON-HELIUM COLLISIONS AT HIGH PROJECTILE ENERGIES

Yu.V. Popov

BLTP, JINR, and Skobeltsin Institute of Nuclear Physics, MSU

The recent high precision experimental and theoretical results are reported. The single differential cross sections for reactions $\mathrm{He}+p \to \mathrm{He}^{+*}+\mathrm{H}$ were measured with use of the most effective coincidence technique at small scattering angles of hydrogen (less than 1 mrads) and the proton energies of 630, 1000 and 1200 keV. The plane wave first Born (PWFBA), second Born, as well as the eikonal wave Born calculations were carried out for the case when the fast hydrogen atom stays in its ground state, while the helium ion can stay both in its ground and in its excited (not resolved) states. Some results were obtained within the new numerical scheme for calculation of 9D oscillating integrals.

Also, the double differential cross sections for reactions $\mathrm{He}+p \to \mathrm{He}^{++}+\mathrm{H}+e$ were measured, where the different distributions of the electron momentum were presented. The PWFBA calculations illustrate these measurements. A high sensitivity to the choice of a trial helium ground-state wave function was observed.

The role and place of the PWFBA in the theory of capture processes is discussed.