Resonant electron transfer cross section from micron sized dust particles to an ion

N. Kh. Bastykova, S. K. Kodanova, T. S. Ramazanov, and Zh. A. Moldabekov

Institute for Experimental and Theoretical Physics, Al-Farabi Kazakh National University, 71 Al-Farabi str., 050040 Almaty, Kazakhstan

Electron resonant transfer from the micron sized spherical dust particle to an ion in gas discharge plasmas is considered. The cross section of this process for the strong dust particle-ion coupling regime, which corresponds to the case of the room temperature gas discharge plasma, is presented. The analysis of the obtained data has been done by comparing with the ion absorption cross section on the surface of the dust particle. It has been revealed that in the considered range of parameters the resonant electron transfer cross section from the negatively charged dust particle to the ion can be presented in the simple analytical form, despite strong non-linearity of the ion-dust scattering problem. Obtained data on the resonant electron transfer from the dust particle to the ion at parameters of gas discharge plasmas is important for the consideration of the momentum exchange between ion and dust particle.