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On charged particle dynamics near flat solid surface

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We have considered the motion of a nonrelativistic charged particle near flat solid surface at sliding angles based on the result of work [S.B. Dabagov and A.V. Dik, “Surface channeling of charged and neutral beams in capillary guides.”, *Quantum Beam Science*, 6(1), 2022.] devoted to the analysis of a nonrelativistic charged particle motion in a cylindrical single capillary. The interaction potential is examined within the formalism of the effective potential composed by the interaction of a particle with surface atoms and excitations. It is shown that the elastic part of effective potential has a not deep potential well capable of capturing a particle. Neglecting the inelastic part of the effective potential, an approximate analytical expression for the transverse energy levels was found. Comparison of the transverse energy values obtained by analytical expression with those calculated numerically showed good agreement.

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