H-H$^+$ RESONANT CHARGE-EXCHANGE in DEBYE PLASMAS

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The investigation on the effects of dense, weakly coupled plasmas on radiative systems and collision dynamics received considerable interest in recent years [1,2], due to the relevance in many technological applications from fusion to astrophysics. In Debye plasmas the effect of the environment is modelled using the Yukawa or static screened Coulomb potential for the fundamental charged particle interaction.

The resonant charge-exchange process in H-H$^+$ collisions in hydrogen Debye plasma has been investigated in the framework of the asymptotic approach [3,4], reformulated to account for the plasma environment. The cross sections for different values of the Debye length, from pure Coulomb interactions ($\lambda_D=\infty$) to the limiting physical condition of existence of the only 1*s* state approaching to the continuum (*Mott effect*), have been estimated and successfully compared with accurate quantum results in Ref. [2].

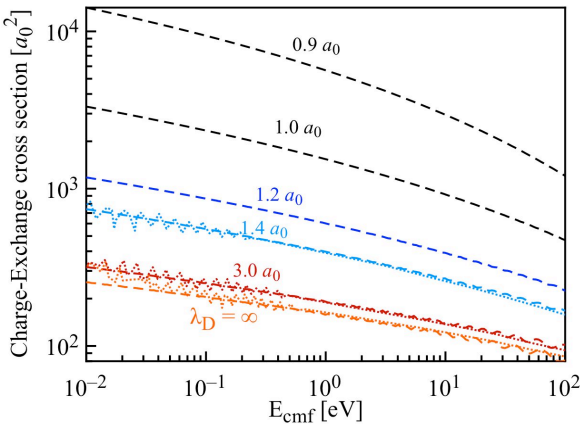

Figure 1: Resonant charge exchange cross sections in H(1*s*)-H$^+$ interaction, for different values of the Debye length. (*dashed lines*) asymptotic approach, (*dotted lines*) Ref. [4].

References

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