

## §16. Plasmon and Spin Interference Effects on Electron Collisions in Hot Quantum Plasmas

Jung, Y.-D. (Hanyang Univ.),  
Kato, D.

The effects of plasmon and spin interference in electron-electron collisions are investigated in hot quantum plasmas. As we see in Fig. 1, the cross section shows the minimum position near the scattering angle  $\theta_L = \pi/4$ . In Fig. 2, it is shown that the plasmon effect suppresses the electron-electron collision cross section for  $0 < \beta (= \hbar\omega_0 / k_B T) < 0.8$  and, however, enhance the cross section for  $0.8 < \beta < 1$ , where  $\omega_0$  is the plasma frequency and  $T$  is the plasma temperature. In addition, it is shown that the spin interference effect strongly suppresses the collision cross section and is more significant near the scattering angle  $\theta_L = \pi/4$ . (see Fig. 3)

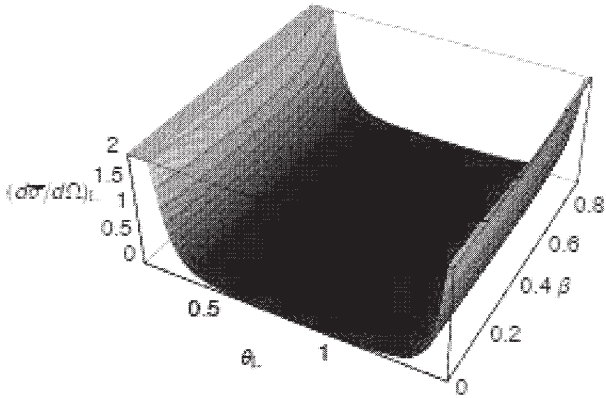


FIG. 1 The surface plot of the differential electron-electron collision cross section  $(d\sigma/d\Omega)_L$  in units of  $\pi a_0^2$  as a function of the scattering angle  $\theta_L$  and parameter  $\beta$  when  $\bar{E}=10$  and  $\bar{L}=100$ .

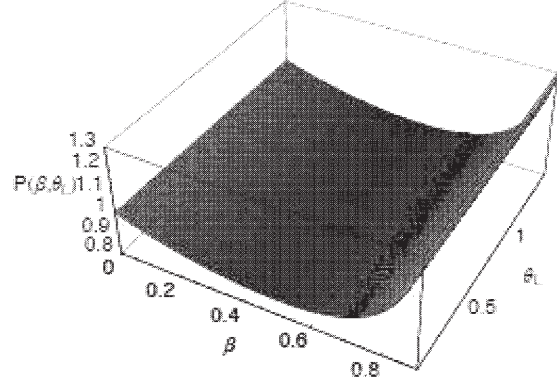


FIG. 2 The surface plot of the function of the plasmon effect  $P(\beta, \theta_L)$  as a function of the parameter  $\beta$  and scattering angle  $\theta_L$  when  $\bar{E}=10$  and  $\bar{L}=100$ .

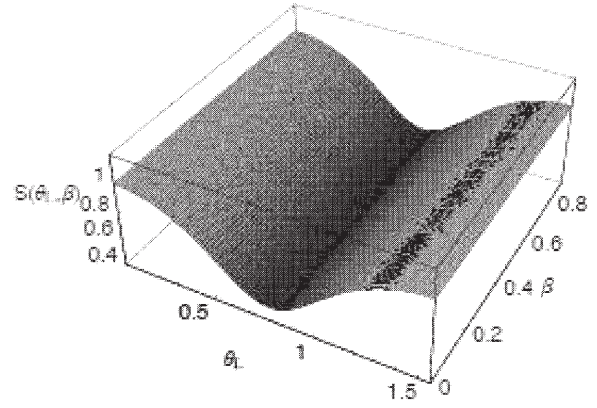


FIG. 3 The surface plot of the function of the spin effect  $S(\theta_L, \beta)$  as a function of the scattering angle  $\theta_L$  and parameter  $\beta$  when  $\bar{E}=5$  and  $\bar{L}=100$ .