Relativistic study on electron and positron scattering by neutral Fe atom at E=1-10^6 eV*)

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The study of elastic and inelastic scattering of electrons and positrons from neutral atomic targets is of fundamental importance in understanding the complex projectile-atom interaction and also the dynamics of the collision process, structures of atoms, molecules and matters in bulk. Iron atom is the most important element in the study of stellar spectra. This paper reports on the differential, integral, momentum transfer and viscosity cross sections along with spin polarization for elastically scattered electrons and positrons from Fe atoms in the energy range $1 \leq E \leq 10^6$ eV. In addition, we report here systematically the details of the critical minima in the elastic differential cross sections, and the absorption, total and ionization cross sections. A model complex optical potential, composed of static, exchange, polarization and absorption terms, is developed to solve the Dirac relativistic equation with partial wave analysis [1]. As of today, neither any experimental nor any theoretical study on the critical minima of electron-, positron- Fe scattering is available in the literature. A comparison of our evaluated cross sections with the available experimental data and other theoretical findings produces a reasonable agreement over the entire studied energy range. Details will be presented in the symposium.

[1] Haque *et al*. Elastic scattering of $e^{\pm}$ by Cd, Hg and Pb atoms at 1 eV≤ E≤ 1 GeV. AQC 83 [in press], 2020.

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