

# CROSS SECTION DATA FOR ELECTRON/POSITRON SCATTERING: A THEORETICAL APPROACH

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There are many areas of applied sciences that require accurate cross section data for electron/positron scattering by atoms and molecules. Electron collision data have applications in areas like modeling of electrical discharges under various conditions of pressure, power, and frequency, in semiconductor processing, gas lasers, low and high-temperature laboratory plasmas, fluorescent lighting, quantitative mass spectrometry, study of upper atmosphere, aurora and interstellar medium [1]. The study of positron interactions with atoms and molecules are significant in atomic physics, surface science, mass spectrometry, atmospheric modeling and medical imaging technique such as positron emission tomography (PET) [2].

In this report, a brief introduction on the methodology developed to calculate various cross sections by electron impact such as differential elastic, total elastic, momentum transfer, inelastic, electronic excitation, ionization, and the total cross sections will be briefly introduced. These calculations were performed using the R-matrix and spherical complex optical potential method [3]. Using these methods total cross section can be computed for incident electron energies from 0.1 eV to 5000 eV. The modified optical potential method to include positron scattering and the calculation of total cross section by positron impact [4] will be introduced. The results from our recent calculations on various important targets for both projectiles will be discussed in detail. A comparative study of various electron induced scattering processes will be presented for a broad spectrum of 0.1 to 5000 eV.

Despite numerous works on electron and positron scattering cross section, there are still various targets of extreme importance in natural and man-made environments, yet to be explored. A unified database like VAMDC [5] for all the electron and positron scattering channels over a broad spectrum is now a challenge and the need of the atomic and molecular collision community. We have initiated a constructive effort in this direction. The data produced by our group will be made available through the database Indian Atomic and Molecular Database (IAMDB, [www.iamdb.co.org](http://www.iamdb.co.org)).

## References

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