

# Electron (and positron) scattering cross sections needed for low temperature plasmas

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High power output in the ITER tokamak requires an efficient cooling. This is done mainly via electron and atomic collisions. As far for carbon-lined tokamaks, the modeling of the edge plasma reproduces well its temperature and density, this is not the case of plasmas containing beryllium and tungsten - atoms and ions, that appear in the plasma via wall-sputtering [1].

The differences between modeling and experimental checks are to be attributed mainly to the poor knowledge of cross sections for atomic targets like metal vapors and their molecules, differently from carbon-containing molecules [2]. Therefore, some extrapolation and semi-empirical analysis of cross sections is to be done in order to derive unknown data [3].

We will compare existing experiments, theories and semi-empirical estimates of cross sections, for total and partial processes, in electron (and positron) scattering on atoms, molecules, radicals and ions. The goal is to guide the choice of data for modeling the edge tokamak plasmas. A by-product of this analysis will be cross sections for the use in modeling industrial (and research) low temperature plasmas.

## References

- [1] S. Brezinsek *et al.* "Study of physical and chemical assisted physical sputtering of beryllium in the JET ITER-like wall", *Nucl. Fusion* **54** (2014) 103001
- [2] M.Y. Song, J.-S. Yoon, Hyuck Cho, Y. Itikawa, G. P. Karwasz, V. Kokoouline, Y. Nakamura, J. Tennyson, "Cross Sections for Electron Collisions with Methane", *J. Phys. Chem. Ref. Data*, 44 (2015)
- [3] G. Karwasz and K. Fedus, "Some systematics in electron scattering cross sections" *Fusion Science and Technology* **63**, No.3 (2013) 338-348