# Evaluation of data in fusion edge transport codes

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Atomic, molecular and plasma surface interaction data (AMS data) are key ingredients in fusion edge plasma transport codes. These codes are indispensible tools both for interpretation of current magnetic fusion experiments, in particular for the plasma domain near exposed components of the furnace chamber. But they are also used to guide reactor design of particle (ash) and heat removal components (so called divertors) from future fusion power plants. In magnetic fusion research the issue of atomic, molecular and PMI data used in transport codes is often regarded as being largely "in hand", and the focus is often on transport terms rather than on the collision integrals in the kinetic equations. However, in particular the favorable plasma states of so called "divertor detachment", which are currently regarded as the divertor operational regime for the ITER fusion reactor and possible also for the first fusion power plants, show a chemical richness and sometimes even dominance over transport issues not otherwise encountered in magnetic fusion. In order to allow evaluation of AMS data in fusion edge transport codes (and their further improvements) the only way seems to be via public exposure of AMS data as activated in any particular code application.

For this puropse the online data analysis tool HYDKIN (www.hydkin.de) is developed and maintained at FZJ. The goal of this online "toolbox" is threefold:

a) processing of the "as unprocessed as possible" raw atomic data (typically: cross sections vs. collision energy) into condensed data as needed in transport codes (e.g.: rate coefficients, or collisional radiative "effective" rate coefficients based on quasi steady state assumptions for some of the species, etc.

b) public exposure of atomic and molecular data as finally active in particular code applications, including also their extrapolation beyond the tabulated or fitted range, as encountered during the code runs,

c) spectral analysis of the collision-radiative rate matrix of the system, providing both identification of possibly underlying reduced chemistry models as well as closed form sensitivity coefficients for all rates and species.

The status of the HYDKIN toolbox, its underlying cross section database, its interface to the EIRENE kinetic (Monte Carlo) Boltzmann solver, and results from a sensitivity analysis for the example of hydrocarbon fragmentation in fusion divertor plasmas is discussed.