

# Providing the Flexible CRM Usable Standalone and Inside Edge Transport Codes Including EIRENE

*D. Borodin, D. Harting, S. Brezinsek*

*Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung –  
Plasmaphysik, Partner of the Trilateral Euregio Cluster (TEC), 52425 Jülich*

The presentation has covered the main ideas as well as motivation for the contribution proposal with the same title. It has also give a flavour of related EIRENE (and CFD-EIRENE packages) development in the frame of international TSVV-5 project based in FZ Jülich.

The presentation has demonstrated the key role the CRMs are playing in the edge-transport modelling in fusion-related plasma devices. It was demonstrated that despite only the unified by Monte-Carlo (MC) approach treatment of CRM and transport effect can possibly allow obtaining the full picture, the stand-alone CRM simulations are really useful for assembling and checking of the underlying atomic and molecular (A&M) data. It was demonstrated that tracing of highly resolved (by vibration states and isotopes at least) molecular data is necessary even for “global” parameters: ~40 % of error in effective total dissociation rate of H<sub>2</sub> and isotopomers if neglected. The concept of the new module “ModCR” was presented which can be used both standalone and insider the EIRENE. Moreover, it can provide a smooth transition between the particles states being tracked as separate MC species and as population variables. The latter can significantly improve performance and improve cancelation error due to the limited statistics in MC on the price of a small bias error. In addition it uses the very same JSON-based format for the CRMs allowing creating the production pipelines for the particular purpose CRMs via several intermediate stages e.g. at first just uniting all the relevant basic data. Obviously such pipelines allow repeating all the stages automatically at necessity e.g. if the basic data is updated. The proposal suggests using this approach it systematic creation of the practice-use data in the interest of the CRP based on MCCC and R-matrix produced basic datasets allowing validation and applications requested by the other participants.