# IAEA Projects on Atomic, Molecular and Plasma-material Interaction Data for Fusion

B. J. Braams[a], H.-K. Chung[a] and K. Sheikh[a]

[a]*Nuclear Data Section, Division of Physical and Chemical Sciences*
*International Atomic Energy Agency (IAEA), Vienna, Austria*

**Abstract.** The IAEA Atomic and Molecular Data Unit, part of the Nuclear Data Section, has the mission to support the development of fusion energy by providing internationally evaluated and recommended data for atomic, molecular and plasma-material interaction (A+M+PMI) processes. The Unit organizes various technical meetings and coordinates an international A+M Data Centre Network (DCN) and an international Code Centre Network (CCN). Currently the IAEA activities involving the DCN and CCN are primarily focused on data evaluation as is described in the presentation by H.-K. Chung at this conference. In addition the Unit organizes Coordinated Research Projects (CRPs), for which the objectives are mixed between development of new data and evaluation and recommendation of existing data. The ongoing and new CRPs are briefly described here and in the poster.

The Unit manages 3 active CRPs on atomic and molecular processes. The CRP on "Light Element Atom, Molecule and Radical Behaviour in the Divertor and Edge Plasma Regions" (2009-2013) is focused on collisional data for elements H-O and their hydrides in fusion edge plasma. The CRP on "Spectroscopic and Collisional Data for Tungsten from 1 eV to 20 keV" (2010-2014) aims to provide comprehensive recommended data for tungsten impurity in core and edge plasma. The CRP on "Atomic and Molecular Data for State-Resolved Modelling of Hydrogen and Helium and Their Isotopes in Fusion Plasma" has the objective to develop a comprehensive database for the main species in divertor and edge plasma. These 3 CRPs were described in more detail already at the 2010 ICAMDATA meeting.

The Unit's new and planned CRPs are all in the area of plasma-material interaction. The wall materials of most interest in current fusion devices are beryllium, tungsten and various carbon-based materials. However, graphite and CFCs look unattractive for a reactor due to their propensity to absorb tritium. ITER will operate with a Be-W wall and since about a year the JET experiment is operating with a Be-W "ITER-Like Wall". For beryllium the main concerns are wall lifetime (gross erosion) and tritium retention whereas for tungsten in ITER the main concern is plasma contamination. For tungsten in a reactor there are concerns associated with radiation damage and transmutation and their effect on tritium retention that need to be understood. Beyond ITER some low activation steels are seen as candidates for the main wall instead of beryllium. With this in mind the Unit is starting a CRP on "Data for Erosion and Tritium Retention in Beryllium Plasma-Facing Materials" set to have its first meeting 26-28 September 2012. We anticipate a CRP on "Plasma-wall Interaction for Irradiated Tungsten and Tungsten Alloys" to start early in 2014. Tentatively the next CRP to start after that is one on "Plasma-wall Interaction with Low-activation Steel Surfaces", but this would be only in 2015 and plans are subject to change.