Contribution ID: **47** Type: **invited**

Future ITER fusion A&M data needs and applications

Monday, 15 July 2024 10:10 (40 minutes)

The ITER Organization (IO) has recently proposed a new baseline to meet the challenges of timely construction of the machine and achievements of the project's objectives. One of the main changes the new baseline brings is the switchover of the first wall armour material from Beryllium to Tungsten. This of course increases the importance of diagnostic measurements and control systems aimed at keeping the core plasma tungsten concentration at a low enough level that will not hinder plasma performance. In this talk, the new baseline rationale and schedule will be presented, including the consequence of the changeover to tungsten. In particular, the IO is considering the need to install a boronization system as a risk mitigation measure to condition the tungsten wall surfaces and help with plasma stability and control. This would bring its own new set of A&M data requirements, replacing the need for Beryllium data, to monitor the Boron content in the plasma, model the Boron deposition and transport in the device, to deduce the lifetime and thickness of the boron layers on the first wall.
This talk then reviews the planned diagnostics systems, with emphasis on those relying on A&M data for their interpretation. These include the X-Ray Crystal Spectrometer and Charge eXchange Resonance Spectroscopy systems for core temperature and impurity content, the Divertor Impurity Monitor, and VUV spectrometers, both in the divertor and in the main chamber.
A separate set of data needs comes from the simulation side, for firming up the physics basis of the revised ITER Research Plan. Of particular importance is how to make sure that a consistent set of data from reliable sources is used when making calculations and measures being considered to guarantee the traceability and reproducibility of the results with the best accuracy available. At ITER, we rely on the Integrated Modelling and Analysis Suite of tools, in particular the AMNS (Atomic, Molecular, Nuclear and Surface) data service library. A preferred source for the needed data is envisioned to be the IAEA CollisionDB database, once technical solutions can be agreed upon for easy runtime code access.

Primary author: BONNIN, Xavier (ITER Organization)

Presenter: BONNIN, Xavier (ITER Organization)

Session Classification: Keynote