EP-10 Transport of fast and thermal ions in steady-state scenarios at high-q

|  |  |  |  |
| --- | --- | --- | --- |
| **TG priority:** High | **Start date:** 2016 | **Status:**  New | **Personnel exchange:**  No  |
| **IO priority:**   | **End date:** 2017 | **Motivation:** Physics Basis |

**No**

|  |  |  |  |
| --- | --- | --- | --- |
| **Device /Association** | **ContactPerson** | **2016 TGRequest** | **Activity (from JEX/JA spreadsheet)** |
| **2016** | **2017** |
| JET | D. Borba | Desirable |  |   |
| DIII-D | W. Heidbrink | Desirable |  |   |
| AUG | P. Lauber | Desirable |  |   |
| EUROfusion | Yu. BaranovP. Rodrigues | Desirable |  |   |

**Purpose**

New Joint Experiment IOS-3.3 has been proposed in ITPA IOS TG. This work should clarify the role of fast ion loss and thermal transport in steady-state scenarios as a function of min(q) in present-day machines. The dependence on min(q) plays a key role in optimizing simultaneously the bootstrap current fraction and fusion gain. Assistance from ITPA EP was requested for unambiguous identification of the fast ion-driven modes in the high-q scenarios. The ITPA EP expertise in both diagnostics and modelling of fast ion-driven modes will be employed for the set of dedicated experiments comparing JET, DIII-D, and AUG plasmas.

**Plans for 2016**

* During the ITPA IOS-3.3 experiment on JET, which will take place in 2016, both reversed- and monotonic shear profiles will be used for comparing the ability of interferometry to detect density perturbations due to Alfven Cascades (ACs) and TAEs. No ICRH will be used, and only beam-driven modes considered, in order to obtain better comparison to DIII-D discharges.
* For the obtained equilibrium, kinetic profiles, and classical NBI, a TRANSP analysis will be performed for assessing thermal ion confinement, and MISHKA/ CASTOR-K analysis will be performed for linear stability analysis of the beam-driven modes.
* The ITPA EP activity in this area will expand to other machines, in accordance with the relevant expansion by the IOS-3.3 Joint Experiment.