Contribution ID: **141** Type: **Poster**

Resistive Wall Mode physics and control challenges in JT-60SA high βN scenarios

Thursday 25 October 2018 08:30 (20 minutes)

The superconducting tokamak JT-60SA is being built in Naka (Japan) under the Broader Approach Satellite Tokamak Programme jointly by Europe and Japan, and under the Japanese national programmme. JT-60SA has an important supporting mission for the development of fusion energy: designed to achieve long pulses (100 s) and break-even equivalent plasmas, challenging high β operation beyond the no-wall limit. It will help in both the exploitation of ITER and in the definition of an optimized DEMO design.
The device will be equipped with off-axis Negative-NBI at 0.5 MeV beam energy, allowing current profile tailoring for Advanced Tokamak scenarios with fully non-inductive current drive. The focus of the work is set on high β N scenarios, in which kink-like instabilities (e.g. one or more RWMs) are potentially unstable and possibly lead to disruptions. In the framework of a joint European-Japanese collaboration, coordinated effort on MHD stability and control modeling is ongoing for the safe realization and exploitation of high β_N plasmas. These scenarios offer a great opportunity to test and verify present models of RWM physics. The drift-kinetic damping model in particular will be considered in the present work, with a stability study in Scenario 5.1 –like plasmas carried out with MARS-F/K. The challenge of active control is also addressed, taking advantage of the set of RWM Control Coils that JT-60SA will have. A dynamic simulator, based on the CarMa code, has been developed for feedback control modeling. A demonstration of this tool is given in one of the aforementioned plasmas, showing potential applications, results and latest developments.

Country or International Organization

Italy

Paper Number

TH/P5-23

Author: Dr PIGATTO, Leonardo (ItRFX)

Co-authors: Prof. VILLONE, Fabio (ItENEACREATE); Dr MARCHIORI, Giuseppe (ItRFX); Dr MATSUNAGA, Go (JpQSTNFI); Dr TAKECHI, Manabu (JpQSTNFI); Dr MASTROSTEFANO, Stefano (DEIM, Università della Tuscia, Largo dell'Università, 01100 Viterbo, Italy); BOLZONELLA, Tommaso (ItRFX); Dr LIU, Yueqiang (UsGA)

Presenter: Dr PIGATTO, Leonardo (ItRFX)

Session Classification: P5 Posters