Contribution ID: **315** Type: **Poster**

Improved Low-Aspect-Ratio RFP Performance with Active MHD Control and Associated Change in Magnetic Topology in RELAX

Thursday, 20 October 2016 08:30 (4 hours)

We have modified the active MHD control system in RELAX in order to compensate for the sideband effect arising from two poloidal gaps of the vacuum vessel. As a result, the discharge duration has reached iron-core-saturation-limited level with stabilization of the resistive wall mode (RWM). The plasma performance has also been improved; the central electron poloidal beta, the ratio of central electron pressure to the edge poloidal magnetic field pressure, has reached ˜15% from ˜10% with the previous control system, where the electron poloidal beta approximately equals the total electron beta in the RFP. After the modification, self-organization to Quasi-Single Helicity (QSH) state has been observed even in deep-reversal discharges. Magnetic field line tracing with ORBIT code shows that helical flux surfaces recover during the QSH state in the core region, although the region is narrower than that in the conventional shallow-reversal case. The transition to QSH and associated change in magnetic topology may be related with improved axisymmetry of the magnetic boundary which is realized by stabilization of the RWM and the resultant improved RFP plasma performance in deep-reversal regime.

Paper Number

EX/P5-22

Country or International Organization

Japan

Primary author: Prof. MASAMUNE, Sadao (Kyoto Institute of Technology)

Co-authors: Dr SANPEI, Akio (Kyoto Institute of Technology); Dr DEN HARTOG, Daniel (University of Wisconsin-Madison); Mr PACCAGNELLA, Dr. (Consorzio RFX and Consiglio Nazionale delle Ricerche (CNR)); Prof. HIMURA, Haruhiko (Kyoto Institute of Technology); Dr MCCOLLAM, Karsten (University of Wisconsin - Madison); Mr HIGUCHI, Masataka (Kyoto Institute of Technology); Dr MIZUGUCHI, Naoki (National Institute for Fusion Science); Mr TSUBOI, Ryosuke (Kyoto Institute of Technology); Mr NAKANOBO, Shun (Kyoto Institute of Technology); Dr MIZUUCHI, Tohru (Institute of Advanced Energy, Kyoto University); Mr NAGANO, Tomoyuki (Kyoto Institute of Technology); Dr AKIYAMA, Tsuyoshi (National Institute for Fusion Science); Mr AOKI, Yosuke (Kyoto Institute of Technology)

Presenter: Prof. MASAMUNE, Sadao (Kyoto Institute of Technology)

Session Classification: Poster 5

Track Classification: EXD - Magnetic Confinement Experiments: Plasma–material interactions; divertors; limiters; scrape-off layer (SOL)