Contribution ID: **522** Type: **Poster**

TH/P3-28: Current Sharing between Plasma and Walls in Tokamak Disruptions

Wednesday, 10 October 2012 08:30 (4 hours)

Plasma disruptions in tokamaks represent a significant obstacle in enhancing performance of the plasma regime, especially in the next step machines, such as ITER. Although, for the global forces due to disruptions on the vacuum vessel there is sufficient certainty because of explicit scalings, e.g., from JET to ITER, many important aspects of plasma interaction with the plasma facing components (localization of forces, their impulse, rotation, etc) require additional consideration.
Here, the new aspects of electric current sharing between plasma and the wall during vertical disruption events (VDE) will be presented. Recently it was understood that theory predicted currents [1] play the major role in VDEs. Called the Hiro" currents, they are excited in the wall by the plasma motion into the wall. Regarding them, the instability, which acts as acurrent" generator, provides large currents independent of resistivity of the plasma-wall contact. The Hiro currents can flow along the tiles surface while the plasma itself shorts out the electric circuit between tiles.
The effect of the Hiro currents might be significant for the ITER plasma facing beryllium tiles. As a result, significant forces (both vertical and sideways) can be applied to the tiles themselves. Also, the edges of the tiles can be potentially damaged by significant Hiro currents flowing between tiles. Realistic numerical simulations of this effect with a presently being developed Disruption Simulation Code (DSC) will be presented. Also, the role of the counterpart of the Hiro currents (edge currents flowing in the same direction as the plasma current) during VDEs will be clarified by simulating VDE. The ESC code is appropriately modified for this purposes. These currents may suggest an alternative interpretation of the tile current measurements during VDE in contrast to the presently adopted "halo" current concept.

Country or International Organization of Primary Author

Princeton University, PPPL, USA

Primary author: Mr ZAKHAROV, Leonid (USA)

Co-author: Dr GALKIN, Sergei (FAR-TECH, Inc)

Presenter: Mr ZAKHAROV, Leonid (USA)

Session Classification: Poster: P3

Track Classification: THS - Magnetic Confinement Theory and Modelling: Stability