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Current and thermal quench in JET and ITER disruptions

Two critical issues in ITER disruptions are the
thermal load during the thermal quench (TQ) and the asymmetric wall
force produced during the current quench (CQ).
Simulations of asymmetric wall force during disruptions [1] with M3D [2]
were shown consistent with JET data.
These results have been extended with M3D-C1 [3] simulations and
compared with additional JET data.
The results confirm decrease of asymmetric wall force
with CQ time, when the CQ time is less than
the resistive wall penetration time.
The asymmetric wall force and impulse
were calculated with the Noll formula [1] for shots in the JET ILW 2011-2016 disruption database,
and compared with simulations.

Recent simulations of thermal quench have been carried out.
The TQ has two phases: a rapid broadening of the temperature profile, and a slow
loss of heat from the plasma. The slow phase can depend on
wall resistivity.
Magnetic perturbations at the plasma edge can increase in magnitude,
increasing parallel thermal conduction and thermal load
from disruptions. A longer resistive wall time reduces this effect.

[1] H. Strauss, E. Joffrin, V. Riccardo, J. Breslau, R. Paccagnella, G.Y. Fu,and JET contributors,
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[2] W. Park, E. Belova, G. Y. Fu,X. Tang, H. R. Strauss, L. E. Sugiyama,
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[3] S. C. Jardin, N. Ferraro, J. Breslau, and J. Chen, Computational Science and Discovery 5 014002 (2012)

Member State or International Organization

United States of America

Affiliation

HRS Fusion

Primary author: Dr STRAUSS, Henry (HRS Fusion)

Co-authors: Dr JARDIN, Stephen (PPPL); JET CONTRIBUTORS

Presenter: Dr STRAUSS, Henry (HRS Fusion)

Track Classification: Consequences