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Asymmetric wall force reduction in ITER and JET disruptions

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It has been thought that asymmetric vertical displacement event (AVDE) disruptions in
ITER might produce large electromechanical forces on the walls and other conducting structures
surrounding the plasma.
It is shown that ITER
AVDE disruptions
should produce a small
asymmetric wall force, comparable to JET. This is demonstrated in simulations [1,2] with the M3D 3D MHD code [3] and confirmed in JET
experiments [4]
in which the current was quenched with massive gas injection (MGI).
In ITER the current quench (CQ) time, tau_{CQ}, is less than or equal to the resistive wall
penetration time, tau_{wall}.
JET is in a different parameter regime, with tau_{CQ} > tau_{wall}.
JET simulations were validated by comparison [1] to JET shot 71985 data and were in good
agreement. The wall time was then artificially increased, keeping tau_{CQ} fixed,
and it was found
that the wall force decreased.
The reduction of the asymmetric wall force was also found in experimental data [4] of
JET MGI mitigated disruption shots.
Further simulations [2] were carried out of ITER AVDEs. The asymmetric wall force was calculated for a wide range of CQ times.
For tau_{CQ} < tau_{wall}, the force was
not much larger than in JET.
A fast CQ may cause production of runaway electrons (REs).
The effect of replacing part of
of the current with REs on MHD behavior will be discussed.
Simulations using a modified
version of M3D with a fluid RE model [5] will be presented.

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