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Formation and dissipation of runaway current by MGI on J-TEXT YUNONG WEI, ZHONGYONG CHEN, DUWEI HUANG, RUIHAI TONG, XIAOLONG ZHANG, Huazhong University of Science Technology — Plasma disruptions are one of the major concern for ITER. A large fraction of runaway current may be formed due to the avalanche generation of runaway electrons (REs) during disruptions and ruin the device structure. Experiments of runaway current formation and dissipation have been done on J-TEXT. Two massive gas injection (MGI) valves are used to form and dissipate the runaway current. Hot tail RE generation caused by the fast thermal quench leads to an abnormal formation of runaway current when the pre-TQ electron density increases in a range of 0.5-2$10^{19}$m^{-3}. 10^{20-22} quantities of He, Ne, Ar or Kr impurities are injected by MGI2 to dissipate the runaway current. He injection shows no obvious effect on runaway current dissipation in the experiments and Kr injection shows the best. The kinetic energy of REs and the magnetic energy of RE beam will affect the dissipation efficiency to a certain extent. Runaway current decay rate is found increasing quickly with the increase of the gas injection when the quantity is moderate, and then reaches to a saturation value with large quantity injection. A possible reason to explain the saturation of dissipation effect is the saturation of gas assimilation efficiency.

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