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Disruption paths in high performance scenarios at JET with D, T, and DT plasmas

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Present contribution aims at comparing the different kinds of disruptions that occurred in the last JET with ITER-like wall (ILW) campaigns with Tritium and Deuterium-Tritium fuels.
Last campaigns performed in JET-ILW with a D fuel showed that the majority (around 80%) of disruptions follow two main paths [1]. The first path (temperature hollowing, TH) is strictly related with the influx of high Z impurities, which can accumulate in the plasma core increasing the radiative losses and deteriorating the electron temperature (Te) profile [2]. The second path (edge cooling, EC) is instead related to the erosion of the edge Te profile; the contraction of Te profiles looks similar to that of a "density limit" disruption [3]. Both paths are found [4] to modify differently the current density profile but always in a way to destabilize a 2/1 mode, which locks before disruption.
In T and in DT campaigns, around the 90% of disruptions can be explained by the occurrence of TH or EC. Furthermore, it is found that in DT the two main scenarios developed at JET [5] are characterized by disruptions following mainly one out of the two paths. In the DT experiments performed in baseline scenario (βN˜1.8, q95˜3), 12 disruptions out of 13 follow an EC; while in the DT hybrid scenario (βN˜2-3, q95˜4) 13 disruptions out of 15 occur after a TH in the ramp-down phase.
The two different kinds of disruptions will be compared for the two high performance scenarios and for the different isotopes contents. The comparison will be performed considering the conditions at onset of the 2/1 modes before the disruption, in terms of the power balance and of the density levels.

[1] C.Sozzi et al. 2020 28th IAEA Fusion Energy Conference -IAEA CN-978
[2] J. Hobirk et al 2018 Nucl. Fusion 58 076027
[3] J.A. Wesson et al. 1989 Nucl. Fusion 29 641
[4] G.Pucella et al. 2021 Nucl. Fusion 61 2021 046020
[5] L. Garzotti et al 2019 Nucl. Fusion 59 076037

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