Major disruptions are the most dangerous instabilities in tokamak plasmas. Understanding the cause and dynamics of major disruptions will improve the strategies to avoid or ameliorate their effects, which is a relevant issue for ITER. In a well established sequence of events the precursor of density limit disruptions starts with the radiative contraction of the current profile, caused by an increase of electron density with impurity accumulation in the edge. Mainly an \( m/n = 2/1 \) tearing mode is destabilized by the contraction of the current profile. During the growth of this magnetic island minor disruptions may be observed before the major disruption. Minor disruptions are characterized by a sudden large heat flux across the \( q = 2 \) surface towards the plasma edge. However only a fraction of the plasma energy is lost and the plasma current is not affected. Relatively to the magnetic island X point, the heat flux is asymmetric and intermittent. Also, in the region where \( 1 \leq q \leq 2 \), large electron temperature gradients are observed during the minor disruption close to \( q = 1 \) indicating that energy confinement is locally very high.

This paper will address the questions raised by these observations, namely why a large magnetic island only destroys energy confinement intermittently and asymmetrically. The experimental observation of a secondary instability (SI) to the magnetic island is proposed as the cause of minor disruptions. As will be shown, no mode numbers could be assigned to the SI. In contrast with the tearing mode, that has a continuous time evolution the SI has an intermittent evolution in time. This behavior is very clear when the tearing mode is quasi-locked to the wall. At this phase the manifestation of the SI coincides with the occurrence of minor disruptions. The events were observed in JET plasmas with the following typical parameters: main gas Deuterium, \( 1.5 \text{ MA} \leq I_p \leq 1.95 \text{ MA} \), \( 2.47 \text{ T} \leq B_\phi \leq 3 \text{ T} \), monotonic safety factor profile, \( 1.1 \times 10^{19} \text{ m}^{-3} \leq n_e \leq 2.15 \times 10^{19} \text{ m}^{-3} \), single null and limiter plasmas.

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