A POWER-BALANCE MODEL OF DENSITY LIMIT IN FUSION PLASMAS
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The \( n_G \) criterion does not describe well the maximum observed densities in a set of high density-disrupted JET L-mode discharges (FIG.1)

A power-balance model, including radiation from impurity and edge neutrals describes fairly well the experiments (example in FIG. 2 for C-wall)

Dependences of the **modeled density limit** can be summarized by:

- \( \left( \frac{P}{V \phi I_p} \right)^{4/9} I_p^{8/9} \), being \( P \) the total heating power
- Concentrations and cooling-rates of emitting species
- Profile effects

FIG. 1. Black: D with C-wall; orange: He with C wall; blue: D with Be-W wall. Crosses (with the same color code) mark the disruptions. The straight black line is the bisector \( y=x \).

FIG. 2. C wall discharges. In addition to C impurity: no neutrals in (a), neutrals with concentration 0.005 in (b). In grey D shots, in orange He shot. The \( y=x \) bisector is plotted in black. Red diamonds mark the disruptions.