

# LHDにおけるタングステン封入TESPELを用いた 放電終結現象に関する研究

## Study on plasma termination phenomena using a tungsten-TESPEL in LHD

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The resistance of magnetically confined high-temperature plasmas to sudden contamination by impurities, and the time scales and effects of the plasma collapse process due to contamination by impurities, using the Large Helical Device (LHD) of the National Institute for Fusion Science (NIFS) has been studied. In this study, tungsten, which is expected to be used as a plasma-facing component material in future fusion reactors, is injected using the TESPEL. The figure shows a typical plasma response when a tungsten-contained TESPEL (W-TESPEL) is injected into LHD plasmas heated by the ECH of 154 GHz, 1.5 MW. In each case, the TESPEL with  $3 \times 10^{17}$  tungsten particles is

injected at the time of 4.75s. In the case without an additional ECH (the left figure), the plasma collapsed for about 0.1 s after the W-TESPEL injection. On the other hand, in the case with the additional ECH of 77 GHz, 0.8 MW (the right figure), the time to plasma collapse was slightly extended. In the presentation, the results of the plasma response when TESPELs with different amounts of tungsten are injected into ECH-heated LHD plasmas and the effect of additional heating applied to avoid plasma collapse will be reported and discussed in more detail.

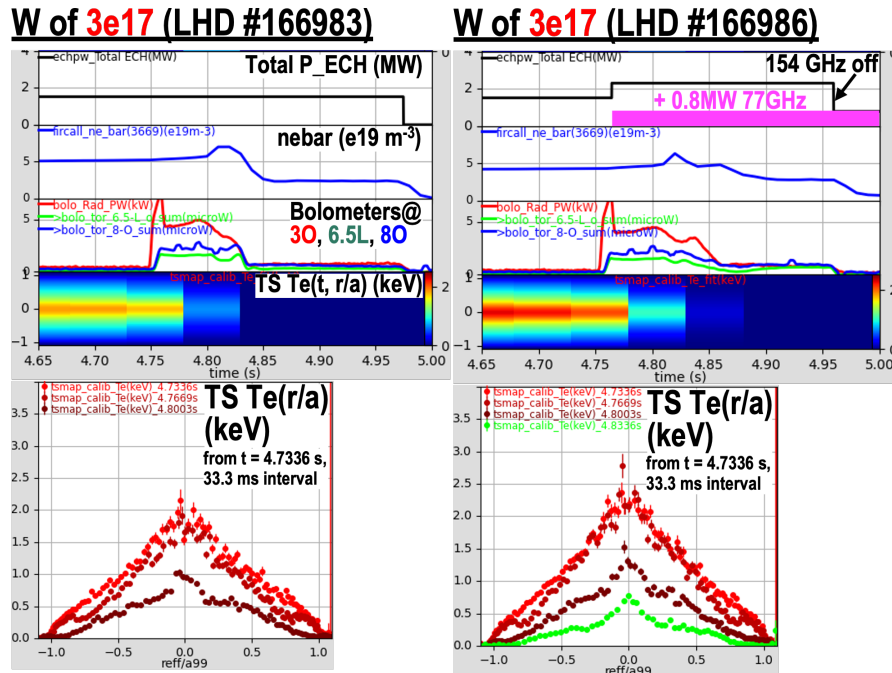


Figure 1. Plasma response of 154 GHz, 1.5 MW ECH heated LHD plasmas to the injection of TESPEL containing  $3 \times 10^{17}$  tungsten particles at the time of 4.75 s: (left) without additional ECH of 77 GHz, 0.8 MW, (right) with additional ECH of 77 GHz, 0.8 MW.