

**Benchmark of Lower Hybrid coupling codes (Brambilla, GRILL3D-U, TOPLHA) with the FTU conventional grill experimental data**

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The present work compares and experimentally validates the results coming out from the following three Lower Hybrid (LH) coupling codes: Brambilla code [1] (M. Brambilla), GRILL3D-U [2] (Mikhail Irzak, A.F.Ioffe Physico-Technical Institute, Russia) and TOPLHA [3] (Politecnico di Torino, Italy). The conventional grill antenna, operating in FTU, is used as benchmark.

A brief overview on the formulation of the codes is presented together with a description of the benchmark setup and the simulated scenarios. Two different phasings between adjacent waveguides, i.e., -90deg and -75deg, are considered.

The validation with experimental data is carried out with respect to the average reflection coefficients at the input of a row of the grill.

A comparison between calculated power spectra is presented, too.

Good agreement can be observed for all the simulated plasma profiles and waveguide phasings between experimental data and codes, in particular for the most recent numerical tools, namely GRILL3D-U and TOPLHA.

[1] M. Brambilla, Nuclear Fusion **16**, 47 (1976).

[2] M.A. Irzak et al., Nuclear Fusion **35**, 1341 (1995).

[3] D. Milanesio et al., AIP Conf. Proc. **933**, 301 (2007).