

P4.1071 Preliminary design of electron cyclotron resonance heating for the COMPASS Upgrade tokamak

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See full abstract here

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.1071.pdf>

COMPASS-Upgrade (COMPASS-U) is a compact-sized, high magnetic field (up to 5 T) and high density (1020) tokamak under development at IPP Prague. COMPASS-U will address the key challenges related to the plasma exhaust physics and it will contribute to provide scalings towards ITER and DEMO.

Heating of plasma in COMPASS-U will be provided by an NBI and ECRH system. Power of 4 MW is planned for both the heating systems. The injection of 140 GHz waves is considered for the fundamental harmonic heating of O-mode [1] from the low-field side. The main purposes of the ECRH heating are to prevent the heavy impurity accumulation [2] (tungsten, nickel etc.), assist the plasma breakdown and suppress instabilities e.g. neoclassical tearing modes (NTMs) [3].

Preliminary evaluations of EC wave propagation and absorption, obtained from simulations with the beam-tracing code TORBEAM [4], will be shown. The key parameters of considered technical solution will be described including the specification of high voltage power supplies and gyrotrons and the design of matching optical units, transmission lines, windows, and mirrors.

References

[1] M. Bornatici, et al., Nucl. Fus. 23(9) 1153-1257 (1983) [2] R. Dux, et al., Journal of Nuclear Materials 313 1150-1155 (2003) [3] M. Maraschek, et al., Nucl. Fus. 52 074007 (2012) [4] E. Poli, et al., Comp. Phys. Comm. 225 36-46 (2018)

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