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The Interaction of the Capacitive and Inductive Coupling Mechanisms with RF Substrate Bias SHUXIA ZHAO, FEI GAO, MING MAO, YOUNIAN WANG, ANNEMIE BOGAERTS, PLASMANT TEAM, PESG TEAM — The interaction of coil power with RF substrate bias at E and H modes is investigated with the Hybrid Plasma Equipment Model. The different electron density changes with RF bias at E and H mode are predicted. In the simulation, the density in E mode increases with increasing RF bias, while in H mode it first increases and then decreases with RF bias. The reason for the difference between the model prediction in H mode and the experiment, where the density keeps decreasing in the considered RF bias range, is explored. It is found that the self-bias plays an important role in the electron behavior. When the self-bias is more negative, the range of low RF bias during which the density increases with RF bias is reduced. Besides, the electron temperature, plasma potential and EEDF are also examined. Lastly, when the RF bias is fixed, the evolution of plasma properties with the coil power is also studied and compared with experiments. This last work is aimed at predicting the collision-less electron heating mechanism by the inductive field, which has been experimentally measured.

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