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6.22 Study of the spatial localization of ECE measurement in LHW-heated plasmas

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Electron cyclotron emission (ECE) measurements have been a powerful tool in diagnosing the electron temperature profiles in magnetically confined plasmas. It has a fairly good spatial and temporal resolutions, and high sampling rate. However, the underlying physics is broken to some extent when the electron velocity distribution has a high energy tail. On EAST, LHW is of high priority because it is the most efficient current-driven technique and the system is very robust. Therefore, it is of great importance to quantitatively study the spatial localization of ECE measurements in LHW-heated plasmas. In this work, the EC emission layer is simulated by using the code SPECE. The results from this code for ohmic plasmas have been compared with an individual code developed at EAST, and the agreement is good. The results for the LHW-heated plasmas indicate that there are two emission layers for an individual frequency, and they are separately attributed to the thermal electrons and non-thermal electrons. Even though the non-thermal emission layer is very broad, the emission power is much smaller than that from the thermal emission layer. The preliminary results imply that the ECE data could be still useful as a localized measurement in LHW-heated plasmas.

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