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2.17 Upgrade of the ECE diagnostic on EAST

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The ECE diagnostic on EAST has been recently upgraded to provide better radial coverage of the plasma and to obtain higher spatial resolution. The lower limit of the frequency band was extended from 104 GHz to 97 GHz by adding a new 8-channel radiometer system, and this ensures a capability of measuring the second harmonic ECE with toroidal magnetic field down to 1.75 T. Also, the existing 32-channel radiometer has been upgraded, with the frequency interval for the lower frequency range up to 120 GHz reduced from 2 GHz to 1 GHz by introducing eight channels in the intermediate frequency part. In addition, a plan is presented to incorporate tunable YIG filters into the existing radiometer system to obtain detailed measurements of the electron temperature gradient scale length as well as finer spatial pinpointing of MHD modes. Examples from DIII-D are provided where similar high resolution channels allowed more precise measurement of the center and width of neoclassical tearing modes. *This work is supported by the National Magnetic Confinement Fusion Science Program of China under Contract No. 2015GB101000 and 2015GB103000 and US Department of Energy under contracts DE-FG02-97ER54415, DE-FC02-04ER54698 and DE-SC0010500.

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