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Characteristics of Ion Cyclotron Emission on the DIII-D Tokamak[1] K.E. THOME, ORAU, D.C. PACE, R.I. PINSKER, GA, C. DEL CASTILLO, Stonybrook U., Y.B. ZHU, W.W. HEIDBRINK, UCI — Understanding the relationship between Ion Cyclotron Emission (ICE) and the energetic particle distribution is important in modern-day tokamaks, since passive measurements of ICE in a reactor environment, such as ITER, could provide information on the alpha particle population and fast-ion losses. ICE is readily excited in DIII-D plasmas by kinetic instabilities resulting from neutral beam injection across a wide operational space, including in both helium and deuterium plasmas. A large set of ICE measurements has been collected over the past two years with multiple receiving antennas digitized at 200 Msamples/sec. The fundamental ICE frequency observed in DIII-D plasmas is in the 5-20 MHz range with typical toroidal magnetic fields of 1–2 T; harmonics are observed up to the Nyquist limit at 100 MHz. These frequencies correspond to both core and edge locations; however, ICE is more often observed at frequencies correlated with ion cyclotron harmonics at the outboard edge. ICE dependencies on plasma and beam parameters such as beam geometry, injection voltage, beam power, plasma density, toroidal field, neutron rate, and ion species are presented. Rapid changes of ICE during ELMs and sawteeth may provide insight into the fast evolution of the beam ion distribution due to these instabilities. Correlation of the ICE signals with the results of other fast-ion diagnostics is essential to compare with modelling of underlying kinetic instabilities.

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