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Fast wave interferometer/reflectometer for ion diagnostics[1] T. AKIYAMA, R.I. PINSKER, D.C. PACE, M.A. VAN ZEELAND, C.M. MUSCATELLO, R.L. BOIVIN, General Atomics, W.W. HEIDBRINK, University of California Irvine — The fast wave, with frequency of several tens of MHz, couples with ions in plasmas. A fast wave interferometer and reflectometer measure line-integrated ion mass density and concentrations of the different species such as D and T. Such fast wave diagnostics are robust even in the harsh environment of burning plasma devices. They typically use small antennas, which are less prone to neutron/gamma issues, and not affected by neutral/impurity deposition like first mirrors in optical systems. This makes the development of fast wave diagnostics especially relevant for future devices. The fast wave diagnostic system, which uses a high power source up to 75 W, is being designed. The system will inject a wave, whose frequency is swept from 10 to 60 MHz to cover an entire plasma region, for the reflectometer. The fixed frequency at above 60 MHz will be used for the interferometer. To obtain sufficient received signal power, fast wave antennas on the low field side, previously used for high-power fast wave current drive, will be used for launching and receiving the probing wave. The phase will be extracted by analog or digital demodulators, whose bandwidths will be MHz range. In case of ITER-like D/T burning plasma, the similar frequency range is available.

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