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☐ Theory ☒ Experiment

Applications of an Ultra-high-speed digitizer in ICRF Experiments on DIII-D,* T. Abrams, *MIT*, R.I. Pinsker, *General*

Atomics, F.W. Baity, *ORNL*, J.-S. Yoon, *KAERI* – Three applications of a high speed 4-channel digitizer capable of acquiring 10^9 samples per second in ICRF experiments on DIII-D are discussed. The digitizer is used to study fast transients in antenna loading caused by antenna arcs and ELMs. The measured rise time of the ELM-induced increase in antenna loading is on the order of a few microseconds. We have not observed any kind of precursor to an antenna arc; the antenna impedance changes on a sub-microsecond time scale. The feasibility of using the device as an rf amplitude and phase detector was also studied, as a substitute for custom modules such as are presently used. Analysis of the data will be done in software, post-pulse. Finally, the digitizer was used in place of an analog spectrum analyzer to record signals from RF probes, allowing the study of parametric decay in high power fast wave experiments. Again, all signal processing (Fourier analysis) is performed after the data is acquired.

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