

Abstract Submitted
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Effect of clock jitter on plasma density measurements relying on direct digital demodulation techniques¹ B.W. HAMMING, Whitworth University, R.A. COLIO, CSU-San Marcos, D.F. FINKENTHAL, Palomar College, M.A. VAN ZEELAND, T.M. DETERLY, General Atomics — Real-time measurement of plasma density is essential to effective closed-loop plasma control systems in fusion-type reactors. The DIII-D tokamak currently employs a Michelson-type interferometer in combination with heterodyned lasers to make real-time density measurements utilizing embedded digital signal processing (DSP) techniques. This technique relies on high-speed analog-to-digital converters clocking at four times the 40 MHz reference frequency, and clock jitter becomes a critical source of noise in the measurement indistinguishable from phase noise of the interferometer signals. We present a study of the effect of clock jitter on system noise and recommendations for improvement.

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