Abstract Submitted for the DPP19 Meeting of The American Physical Society

Modified Hairpin Resonator for Electron Density Measurements<sup>1</sup> YHOSHUA WUG, XINGCHEN FAN, SHON MACKIE, PATRICK PRIBYL, TROY CARTER, Basic Plasma Science Facility at UCLA — This work explores hardware modifications to a previously developed hairpin probe, used to measure plasma density (see X. Fan, reported at this conference). The probe consists of a signal of adjustable frequency indirectly coupled to a U-shaped piece of wire that forms the resonator. Coupling is near the shorted end using a small loop formed at the end of a coax. A detected signal is received by a loop at the end of a second coax. The hardware describe here consists of a microwave oscillator, a coupler, an IQ-mixer and an amplifier, is an advanced version of the original circuit described by Fan. This new circuit is designed to a) use our own circuit board rather than the off-the-self components used by Fan, and b) replace the single output mixer with an IQ mixer. The new mixer circuit should enable automatic resonance tracking using a circuit described by S. Mackie, also at this conference. Detailed comparisons with other diagnostics for measuring plasma density will be presented, in particular an RF compensated Langmuir probe used in a process plasma, microwave interferometer line-integral data, and a normal Langmuir probe typically used in the Large Plasma Device at UCLA.

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Date submitted: 12 Jul 2019

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