## Abstract Submitted for the DPP11 Meeting of The American Physical Society

A Microwave Interferometer for Density Measurements on CTH<sup>1</sup> M.C. MILLER, J.-T. CHEN, G.J. HARTWELL, S.F. KNOWLTON, B.A. STEVEN-SON, Auburn University — Most plasma physics research experiments rely heavily on plasma density measurements; requiring these diagnostics to be reliable, easily maintained, and relatively inexpensive. On the Compact Toroidal Hybrid experiment (CTH), disruptions can be triggered by high density excursions, which are often associated with a vertical displacement. The existing horizontally viewing 4 mm wave system loses the ability to count fringes at those high densities and vertical offsets. A new three channel 1 mm wave Michelson interferometer for use on CTH has been designed, assembled, and tested. Several design features lend to reliability and maintainability. The interferometer employs a single electronically tunable source that is repetitively chirped to provide heterodyne detection. A drive oscillator operates at 15.25 GHz and is multiplied through two stages up to 122 GHz before a final doubler stage brings it to 244 GHz. The local oscillator at 122 GHz is fed into a subharmonic mixer for each viewing cord. The lower frequency of the reference beam allows wave guide to be used with low loss and greatly reduces alignment difficulty. Phase detection is performed digitally. An overview of the design and preliminary data will be presented.

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M. C. Miller Auburn University

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