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Experimental High Power Plasma-Filled Backward Wave Oscillator Results, K. MINAMI, W.R. LOU, W. W. DESTLER¹, R.A. KEHS¹, V. L. GRANATSTEIN, and Y. CARMEL², University of Maryland, College Park, MD 20742.

Previous results by Tkach et al.^[1] have indicated that a background gas can be used to increase the output microwave power of relativistic backward wave oscillators (BWOs) two or three times the vacuum case. In our experiments, two methods of plasma production are investigated in detail: (1) the use of the electron beam to ionize a background gas, and (2) the use of a plasma gun to inject a background plasma into the slow-wave structure of a BWO. It is found in the first case that there was a resonant increase in microwave power at a particular pressure of the background gas by a factor of ten. In the second case, power also increased compared with power production in vacuum. Detailed results will be presented and the relative merits of the two approaches will be discussed and compared with theoretical expectations.

[1] Yu. V. Tkach, et al., *Sov J Plasma Phys* 1(1), p43 (1975).

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