

Abstract Submitted
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Research and Development for an Alternative RF Source Using Magnetrons in CEBAF.¹ ANDREW JACOBS, Benedictine College — At Jefferson Lab, klystrons are currently used as a radiofrequency (RF) power source for the 1497 MHz Continuous Electron Beam Accelerator Facility (CEBAF) Continuous Wave (CW) system. A drop-in replacement for the klystrons in the form of a system of magnetrons is being developed. The klystron DC-RF efficiency at CEBAF is 35-51% while the estimated magnetron efficiency is 80-90%. Thus, the introduction of magnetrons to CEBAF will have enormous benefits in terms of electrical power saving. The primary focus of this project was to characterize a magnetron's frequency pushing and pulling curves at 2.45 GHz with stub tuner and anode current adjustments so that a Low Level RF controller for a new 1.497 GHz magnetron can be built. A Virtual Instrument was created in LabVIEW, and data was taken. The resulting data allowed for the creation of many constant lines of frequency and output power. Additionally, the results provided a characterization of magnetron oven temperature drift over the operation time and the relationship between anode current and frequency. Using these results, the control model of different variables and their feedback or feedforward that affect the frequency pushing and pulling of the magnetron is better developed.

¹Department of Energy, Science Undergraduate Laboratory Internships, and Jefferson Lab

Andrew Jacobs
Benedictine College

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