

## **FAST FEEDBACK SYSTEM FOR ENERGY AND BEAM STABILIZATION**

R. Dickson, Jefferson Lab; V. Lebedev, Jefferson Lab

The electron beams being delivered to targets of the Continuous Electron Beam Accelerator Facility (CEBAF) at Thomas Jefferson National Accelerator Facility (TJNAF) are plagued with undesirable positional and energy fluctuations. These fluctuations primarily occur at harmonics of the power line frequency (60, 120, 180, etc. hertz), and their cause is rooted in electromagnetic fields generated by accelerator electronic equipment. It is possible to largely nullify these deviations by applying real time corrections to electromagnets and RF verniers along the beam line. This concept has been successfully applied at TJNAF by extensively modifying the existing Beam Position Monitor (BPM) system with the integration of an algorithm that computes correction signals targeted at the power line harmonics. Many of the modifications required were due to the existing CEBAF BPM system not having the data acquisition bandwidth needed for this type of feedback system. This paper will describe the techniques required to transform the CEBAF standard BPM system into a high speed practical fast feedback system that coexists with the large scale control system - the Experimental Physics and Industrial Control System (EPICS) - that runs the CEBAF accelerator in daily operation.