

LA-UR-02-7415

Approved for public release;  
distribution is unlimited.

*Title:* Calculations and Observations of the Longitudinal Instability  
Caused by the Ferrite Inductors at the Los Alamos Proton  
Storage Ring (PSR)

*Author(s):* Chris Beltran, A. A. Brownman and R. J. Macek

*Submitted to:* Particle Accelerator Conference 2003



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the U.S. Department of Energy under contract W-7405-ENG-36. By acceptance of this article, the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

Form 836 (8/00)

# **Calculations and Observations of the Longitudinal Instability Caused by the Ferrite Inductors at the Los Alamos Proton Storage Ring (PSR)\***

Chris Beltran

Los Alamos National Laboratory, Los Alamos, NM, USA

Indiana University, Bloomington, IN, USA

National Physical Science Consortium

A. A. Brownman and R. J. Macek

Los Alamos National Laboratory, Los Alamos, NM, USA

The frequency dependence of the complex permeability of the ferrite (at room temperature) used in the Inductors at PSR have been determined by comparing the  $S_{11}$  parameters of a jig containing a ferrite core, and a MAFIA simulation of the jig. Both the resonance frequency and the longitudinal impedance of the inductor were obtained by simulating the inductor cavity in MAFIA. Experimental observations of the longitudinal instability caused by the ferrite inductors at room temperature for both DC Coasting beams and Bunched Coasting beams at a variety of intensities have been conducted. Comparisons of observed and calculated growth times, thresholds, resonant frequencies, and width of the instability will be discussed.

---

\*Work conducted at the Los Alamos National Laboratory, which is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.