

## **Characterizing Transverse Beam Jitter in the SLC**

**Linac,** E.-J. DECKER, R. PENNACCHI,

B. PODOBEDOV, R. STEGE, J. TURNER, SLAC -

Transverse pulse-to-pulse trajectory instability, jitter, in the linac of the SLAC Linear Collider (SLC) can be caused by various sources, including mechanical vibration, poor power supply regulation, and malfunctioning of trajectory feedbacks systems. Additionally, the linac can amplify pulse to pulse centroid motion that originates in the damping ring or the transport line that connects the ring to the linac. The purpose of this study is to identify and characterize these sources and to apply corrections and fixes. Transverse jitter has been reduced in the last year from 0.5 to 0.2 in x and 1 to 0.3 in y, measured in units of beam size. Jitter is estimated using position monitor data from a large sample of successive pulses. The FFT power spectrum of the data often indicate roughly equal contributions from motion at 59 Hz due to the accelerator cooling water pumps, 10 Hz motion due to mechanical vibration or power supplies, and  $<0.4$  Hz due to the feedback loops. Some of the broadband, or random, pulse to pulse motion can be correlated with the microwave instability in the damping ring. In this paper we describe the data analysis and interpretation that can be used to help locate the subsystem component which is causing the instability.

\* Work supported by the Department of Energy, contract DE-AC03-76SF00515.