Abstract Submitted
for the APR06 Meeting of
The American Physical Society

An Active X-Band High Power RF Compression System Using an Ultrafast Silicon Switch JIQUAN GUO, SAMI TANTAWI, Stanford Linear Accelerator Center/ Stanford University — In this paper, we present the recent results of our research on the ultra-high power fast silicon RF switch and its application on active X-Band RF pulse compression systems. This switch is composed of a group of PIN diodes on a high purity silicon wafer. The wafer is inserted into a cylindrical waveguide operating in the TE01 mode. Switching is performed by injecting carriers into the bulk silicon through a high current pulse. Our current design uses a CMOS compatible process and the fabrication is accomplished at SNF (Stanford Nanofabrication Facility). The RF energy is stored in a room-temperature, high-Q 400 ns delay line; it is then extracted out of the line in a short time using the switch. The pulse compression system has achieved a gain of 11, which is the ratio between output and input power. Power handling capability of the switch is estimated at the level of 10MW.

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Date submitted: 14 Jan 2006 Electronic form version 1.4