

Operational Experience with the RF Control for the TESLA Test Facility, I. ALTMANN, A. GAMP, K. REHLICH, T. SCHILCHER, S.N. SIMROCK^{*}, DESY - In the rf system for the TESLA Test Facility each klystron supplies rf power to 16 cavities. The superconducting cavities are operated in pulsed mode and at high accelerating gradients. The control of significant Lorentz force detuning and precise measurement of the vector sum are the main issues to be solved. Presently two control systems are under development with the goal to compare the performance of analog versus digital feedback systems. A common feature of both systems is the use of feed forward to minimize power needs and control effort. Prototypes of have been evaluated during operation of a single cavity at gradients up to 25 MV/m. The nominal beam loading of 8 mA is simulated by reduction of the incident power to 25% at the time of beam injection. The resonance frequency of the cavity at the beginning of a pulse is adjusted for minimum power requirements. Then feedback loop gains are selected for minimum residual amplitude and phase error. Next the feed forward tables are adjusted to minimize the control effort of the feedback loop. The cavity parameters which are used to describe the dynamics of the Lorentz force detuning have been determined. Good agreement has been achieved between measurements and simulation results.

* On leave of absence from CEBAF.