

Transient Beam Loading Based Calibration of the Vector-Sum for the TESLA Test Facility,
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each klystron drives multiple cavities. The rf feedback system will regulate the vector sum of 16 cavities. Phase and amplitude errors of the individual cavity field probe signals result in a contribution to the energy spread in presence of microphonic noise. An energy spread contribution of $2.7 \cdot 10^{-4}$ for 16 cavities requires gradient calibration of $\pm 10\%$ and phase calibration of $\pm 1^\circ$ for a microphonic noise level of $\pm 10^\circ$. A procedure which meets these requirements is based on beam induced transients. For the phase offset calibration the transients are observed at zero crossing and the offset is determined by nulling of the average transient by changing the cavity phase. The field calibration is accomplished by observation of the transients on crest when the beam current is known or relative calibration to other cavities if the beam current is not known. A description of the hard-ware, software, and calibration procedures are given, and results of measurements under actual operating conditions but with simulated beam are presented.

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