

A Fast and Accurate Phasing Algorithm for the RF Accelerating Voltages of the SLAC Linac,
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J.J. RUSSELL, F. ZIMMERMANN, SLAC - The RF phases, defined as the phases between the crests of the RF accelerating voltages and the accelerated beam, must be controlled within a few degrees in the linac of the SLAC Linear Collider (SLC). Changes in the RF phases not only affect the available acceleration but more importantly modify the dynamics of the accelerated beam, e.g. the beam optics. Precision phase control is therefore crucial for maintaining high beam quality. We present a fast and accurate algorithm to determine the effective RF phase for groups of eight klystrons in the linac, the so-called subbooster phase. The new phasing method was implemented in 1997 and it was used to routinely determine all linac subbooster phases in about 2 minutes with a typical accuracy of 2 degrees. Using this algorithm a day-night variation of the linac master phase reference that was inferred from beam measurements in 1996 was directly confirmed and the online compensation verified.