

Improvements in Emittance Wakefield Optimization for the SLAC Linear Collider,

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The transverse emittances in the SLAC Linear Collider can be severely diluted by collective wakefield effects and dispersion. For the 1997/98 SLC/SLD run important changes were implemented in the way the emittance is optimized. Early in the linac, where the energy spread is large due to BNS damping, the emittance growth is dominated by dispersion. In this regime emittance tuning bumps may introduce additional wakefield tails and their use is now avoided. At the end of the linac the energy spread is minimal and the emittance measurement is most sensitive to wakefield emittance dilution. In previous years, the emittances were tuned on wire scanners located near but not at the end of the linac (after about 90% of its length). Simulations show that emittance growth of up to 100% can occur in the remaining 10%. In this run wire scanners at the entrance of the Final Focus, the last place where the emittances can be measured, were used for the optimization. Screens at the end of the linac allow additional real time monitoring of the beam sizes. We show that the different tuning strategy provided significantly improved emittances at the interaction point of the SLC.