

An Automated Tuning Mechanism for the Eindhoven Racetrack Microtron, J.I.M. BOTMAN, W.H.C. THEUWS, F.F. DE WIT, Eindhoven Univ. of Technology, Cyclotron Laboratory; S.R. WEIJERS, M. WEISS, Eindhoven Univ. of Technology, Systems and Control Group - An automated tuning mechanism for the adjustable parameters of the Eindhoven RTM has been developed. The RTM has seventeen adjustable parameters: the excitation currents of the two end magnets and of twelve correction magnets (one at every turn), the beam energy and phase at injection, and the energy gain per turn. In order to meet both the closed-orbit condition and the isochronism condition the adjustable parameters need to have specific values, which are effected by misalignments and machine errors much more than their tolerances. Hence, the adjustable parameter values cannot be calculated sufficiently accurate beforehand as the misalignments and machine errors and consequently their effects are unknown. Twenty-five beam-position monitors have been installed in the RTM: two for each turn and one at the extraction point. The tuning mechanism that has been developed uses the measured beam positions obtained during one trial to adjust the RTM parameters for the next trial. The adjustment is based on a feedback control strategy that is designed such that the tuning is completed in a minimal number of iterations. The proposed tuning mechanism has been studied using numerical simulations of the accelerator.