

General Particle Tracer: A New 3D Code for Accelerator and Beamline Design,

S.B. VAN DER GEER, M.J. DE LOOS, FOM-RIJNHUIZEN - We report on the internal structure of the General Particle Tracer (GPT). GPT is a new computer code to study charged particle dynamics in electromagnetic fields. To ensure both accuracy and speed a fifth order Runge-Kutta method with adaptive stepsize control is used to solve the particle's equations of motion in time domain. Any additional differential equations can be solved while tracing the particles. The code is completely 3D, including the spacecharge model. Additional GPT features include the complete freedom in initial particle distribution and the flexibility to position and orient all beamline components. Separate utility programs calculate macroscopic quantities, produce ascii/graphical output and automate parameter scans. GPT is written in POSIX/ANSI-C for portability and has been demonstrated to run on several Unix platforms and PC's. It uses a YACC parsed input file language supporting variables and expressions to describe the simulated set up. Simulation results demonstrating its capabilities will be presented.