The Particle Beam Optics Laboratory (PBO Lab),
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CA - The Particle Beam Optics Laboratory (PBO Lab)
represents a new approach to providing software for particle
beam optics modeling. The PBO†Lab includes four key
elements: (1) a graphic user interface shell, (2) a graphic
beamline construction kit for users to interactively and
visually construct optical beamlines, (3) a knowledge
database on the physics and technology of optical elements,
and (4) various charged particle optics computation engines.
The graphic user interface shell and beamline construction
kit software utilize a new multi-platform (MP) version of
the Shell for Particle Accelerator Related Codes
(S.P.A.R.C.). The knowledge database is implemented
with a combination of S.P.A.R.C. MP graphic components
and a hypertext system - providing dynamic, interactive
tutorials. Several computation engines are available. A
first-order matrix code, including a space charge model, can
be used to produce scaled images of beamlines, with
overlays of individual trajectories and beam envelopes. The
results of graphically moving beamline components, or
adjusting bend and edge angles, can be explored
interactively. Quantitative computation engines currently
include the third-order TRANSPORT code and the ray
tracing program TURTLE. The PBO Lab is described and
illustrations from the Windows95/NT implementation are
presented.