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Advanced Accelerator Simulation Project (SciDAC)

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http://cepa.fnal.gov/psm/aas/Advanced_Accelerator_Simulation.html

March '04 project report

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Timeline from March '03 presentation

- 3 year SciDAC funding (~$350k)
  - FY03 second year since funds arrived.
  - FY04 finish development of space-charge code, documentation, make code available. Project wide proposal for 2 year extension.
  - FY05 and beyond:
    - ⇒ would like to continue involvement with beam modeling
    - ⇒ if the project is extended, will work on development of additional physics capabilities

⇒ If additional manpower study other machines

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Status

- We are (slightly) ahead of our '03 timeline
  - Finished development & documentation of the space charge package
  - Modularized and encapsulated components
    - More flexible framework, ready to accept new physics modules (w/TechX SBIR)
- Submitted two year extension proposal (SciDAC)
- Submitted proposal to NSF (with DePaul) for solver optimization

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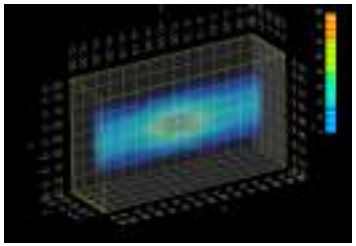
Status, cont

- Improved packaging and distribution, including documentation
- Added applications for the A0 photoinjector and started working with the A0 collaboration
- New utilities for
  - beam generation & matching
  - analysis, visualization & data storage



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Status/plans

- In Fy04 wrap-up Booster modeling (space-charge studies)
- Publish Synergia description & Booster studies
- In collaboration with LBNL begin incorporating beam-beam effects
- Extend A0 modeling

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Other possibilities (FY04)

- Beam-beam studies at the Tevatron
  - It is important we apply beam-beam modeling @ Tevatron using the same approach as with space charge @Booster: studies, validation, realistic parameters
  - current level of involvement 1.3 + 0.3 FTE (1 JFA + 0.3 PGS + 0.3 PGS research time) is not sufficient. Will need additional 0.5 FTE dedicated to this effort

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Future plans

- Electron Cooling
  - Will interface UCLA/USC existing physics module (FY05)
- Intra-beam scattering (FY05)
  - Will develop new module (straight forward)
    - Capability needed for Tev simulations
- Additional manpower will accelerate development & will make effort more relevant for Run II.