Chapter 4 strawman inner tracker TDR (so far)

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STAR inner tracker upgrade workshop
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Mechanical support structure

- Low mass to limit multiple scattering/secundaries
  - Carbon fiber?
  - Else? Injection molding?
- Supports
  - 3 inner tracker layers
  - Pixel detector
  - Inner forward silicon tracker
- Keep it small, cheap, stable
- Mechanical accuracy
  - Overall 100um
  - Local < 50um

Silicon sensors

- First conservative choice are silicon strip sensors
  - Well established manufacturing process
  - Mastered by several manufacturers
  - Always first choice for high-energy trackers
- Use stereo pair to get 2-d resolution
  - Back-to-back sensors at certain angle
  - BUT, still feed out signals to same side
  - Small strip stereo angles or mechanically->dead area
- Make steree angle sensor in double metal
  - Signal traces over surface of sensor
  - More complicated to make, i.e. more costly

Cooling system

- Underpressure water cooling
- Precautions against algea and little fish
  - Keep it dark
  - Flush once a year with chlorine solution?
  - Ozonizer?
- Cooling at ambient T to avoid condensation
- Copy Phobos design?
- Take Phobos design?

Front End Electronics

- No specifics known yet
- Most likely has to read out the APV25-S1 chip

FEE-DAQ interfacing

- Nothing specific known yet
- Most likely fibers between FEE and DAQ to avoid grounding problems

Power supplies: High and Low V

- Preference for hefty/clunky linear supplies
- Most likely almost of-the-shelf supplies
- Need for remote control

Allignment procedure

- Survey the sensors
- Survey the modules
- Survey the ladders
- Survey the tracker in the lab
- Survey the tracker in situ
- Survey while running?
  - RASNIK system?

Slow Controls System

- Current STAR standard is EPICS
- Other option is LabView
  - Runs on Windows and Linux
  - Provides virtually any hardware driver
  - Provides very convenient user interface
  - Simple to get going (usually grad student's job)
  - Relativily simple to interface to EPICS
- Controls/Checks:
  - Temperature of hybrids
  - Currents/Voltages on hybrids
  - Power supplies
  - Cooling system
  - Dry air system

Installation procudure

- Six persons
  - Four to carry the tracker
  - Two to keep cables and people out of the way