Status of the PandaRoot development for the Forward Shashlyk Calorimeter

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Goals

Task	From scratch	Use existing emc code
Full geometry description & macro	Yes	No
Points inside active volumes	No	Yes
Hits creation	No	Yes
Digitization	Possible	Possible
Cluster finder algorithm	No	Yes
Overlapped showers splitting algorithm	No	Yes
Optical model for Cherenkov light	Yes	No
Sim, reco, analysis macros	No	Yes

History (errors & wrong ways)

- The project was started as a completely separate detector
  - 2 versions (11x11 cm^2, 5.5x5.5 cm^2) in 2 formats (ASCII .dat and .geo) were created
  - FSC dir in PandaRoot structure
  - Classes: FscDetector, FscPoint, FscHit, FscHitProducer, FscDigi
  - Macros: CreateGeometry for 2 formats, simFSC, drawFSC, hitFSC, analFSC
  - Wrong way!
- An attempt to use at least geometry failed
  - It's not so easy to make existing EMC ASCII geometry loader to read FSC .dat and .geo files
  - Never got read

Current status

- Geometry in ROOT format (including holes, fibers, wrapping: *emc_module5_fsc.root*
- Corresponding macro: *createRootFscGeometry.C*
- Class *PndEmc* modified:
  - Functions modified: *SetGeometryFileName(), SetGeometryVersion(), ConstructGeometry(), ProcessHits()*
  - Functions added: *CostructRootGeomMod5(), SetGeometryFileNameQuadruple()*
- Class *PndEmcMapper* modified:
  - Mapper instances versions 8 and 9 added
  - Version 8 – to call geometry version 16 – for testing (only FSC module loads)
  - Version 9 – to call geometry vesrion 17 – complete EMC geomtry – all 5 modules
- This is enough to start some MC
- Code ready for commitment to PandaRoot repository

Plans

- Modify classes for Hits, Digi, cluster finder & overlapped showers algorithms
- Implement optical model
  - Generate opt. γ in scint plate in 4π: $N_{ph}=E_{dep}/100\ eV$
  - Propagate γ's by hand until it dies (atten. length 70 cm or escapes the plate) or is captured by the fiber (prob. ~ 0.1). Process takes into account:
    - TIR efficiency for large scintillator sides ~ 0.97
    - DTR efficiency for lateral small sides ~ 0.97
  - Propagate γ (Cherenkov - gen by GEANT or optical – captured from scintillator) inside fiber until it dies (atten. length 400 cm) or reaches photocathode
- Produce some physics for Fsc TDR