

Status update of IRT 2.1 code adaptation to ePIC software stack

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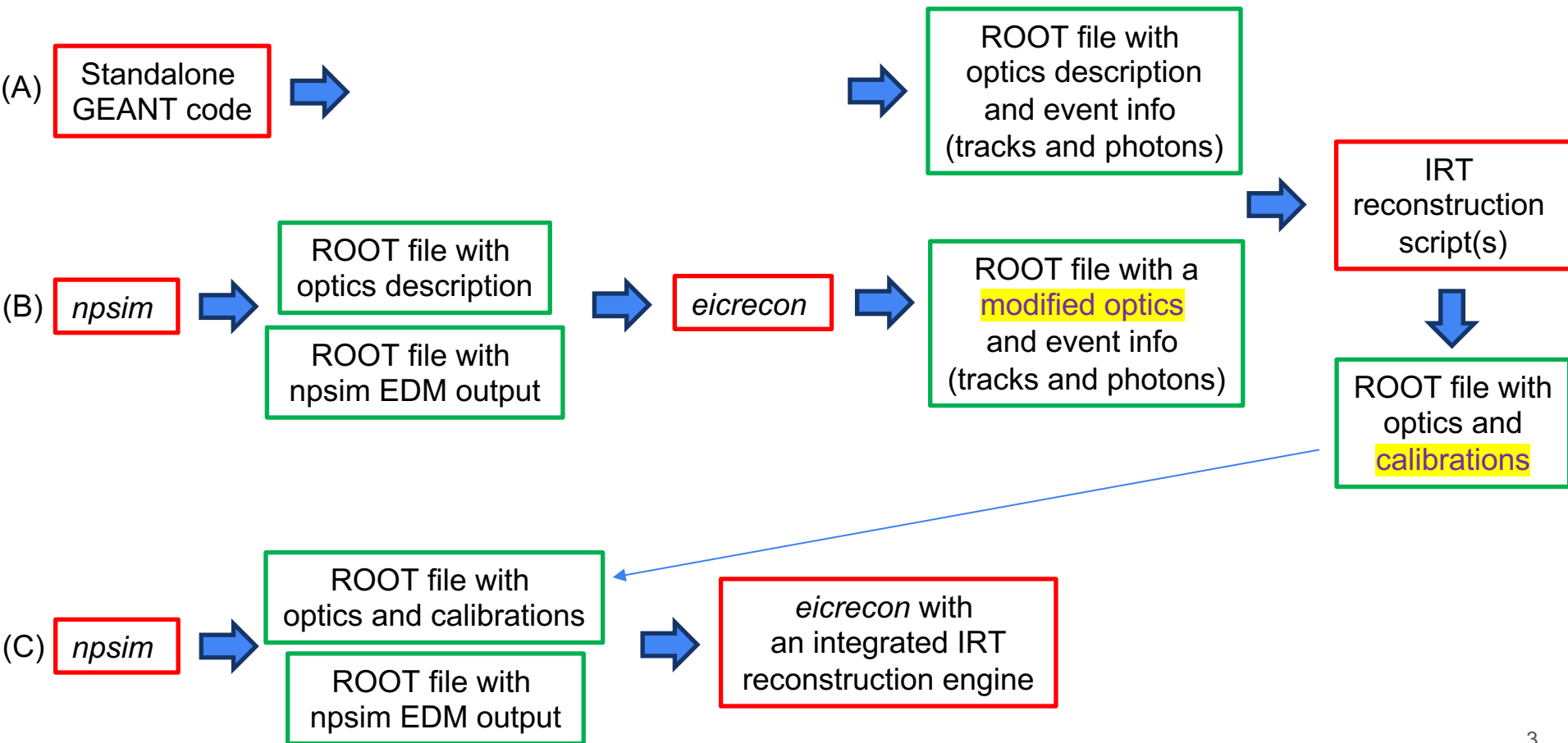
ePIC pfRICH Software Meeting, 08/21/2025

Progress since the JLab meeting

[README.md](#)

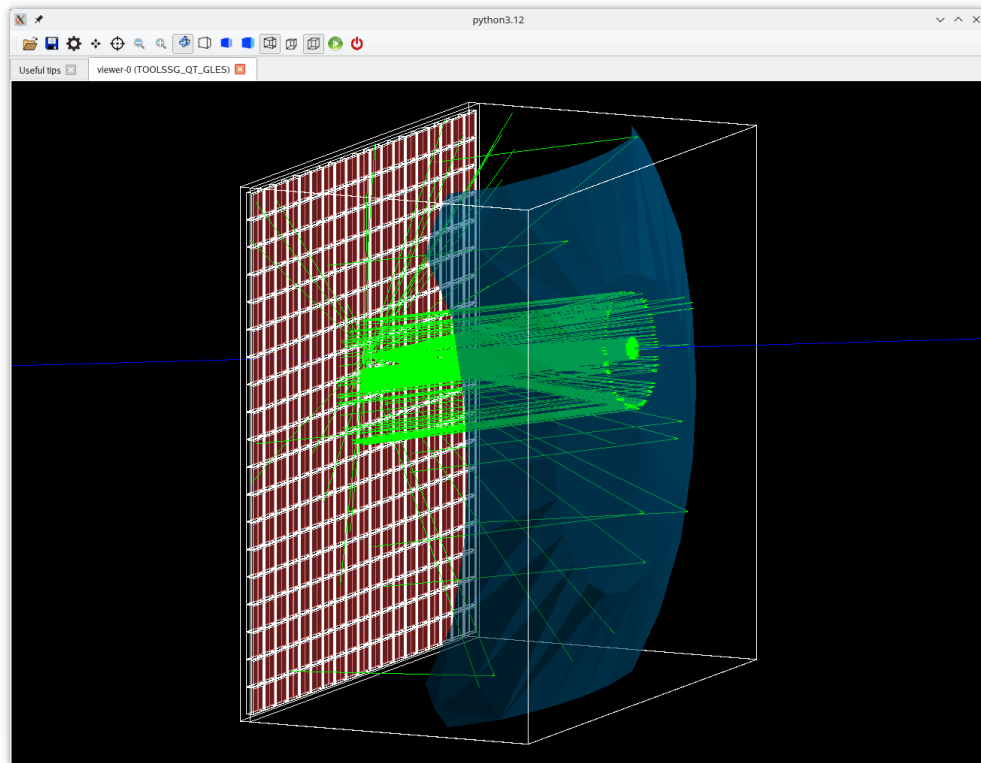
- IRT 2.0 -> 2.1a
 - Codes re-based against early August epic and ElCrecon repositories
 - Shown to work with a 25.07.0-stable Docker image
- A unified “gas + aerogel” case confirmed to work (for FRICH mockup detector)
- Calibration data made persistent in the IRT optics ROOT file
- Functionality without a standalone .C script at the end of the chain demonstrated
 - IRT reconstruction engine called within *IrtInterface* plugin, though ...
 - ... no JSON config parser yet (just a cut’n’paste of the .C script contents hardcoded)
- Substantial generalization and clean-up in several places
 - ACTS tracking interface in particular

Sandbox setup evolution

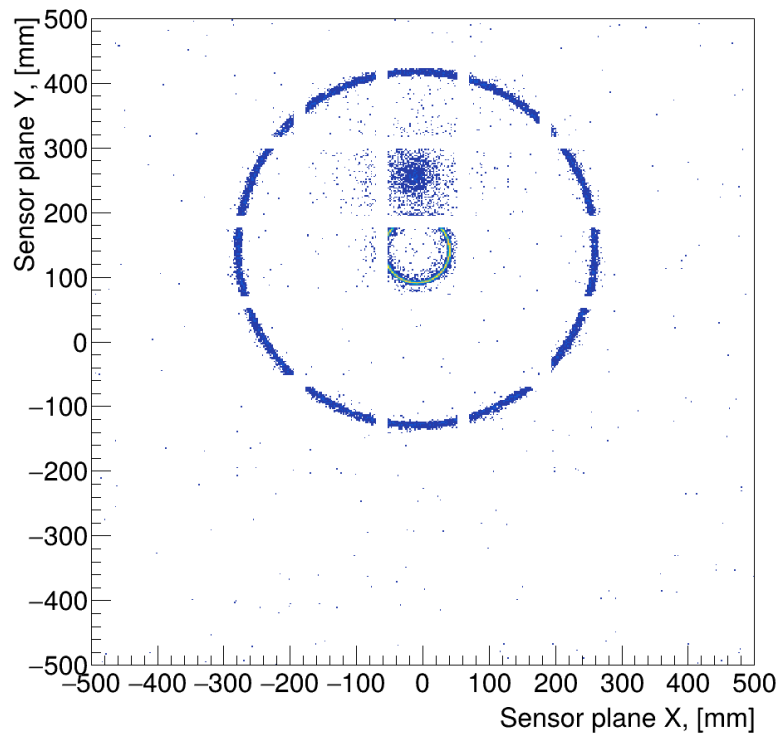


FRICH mockup implementation

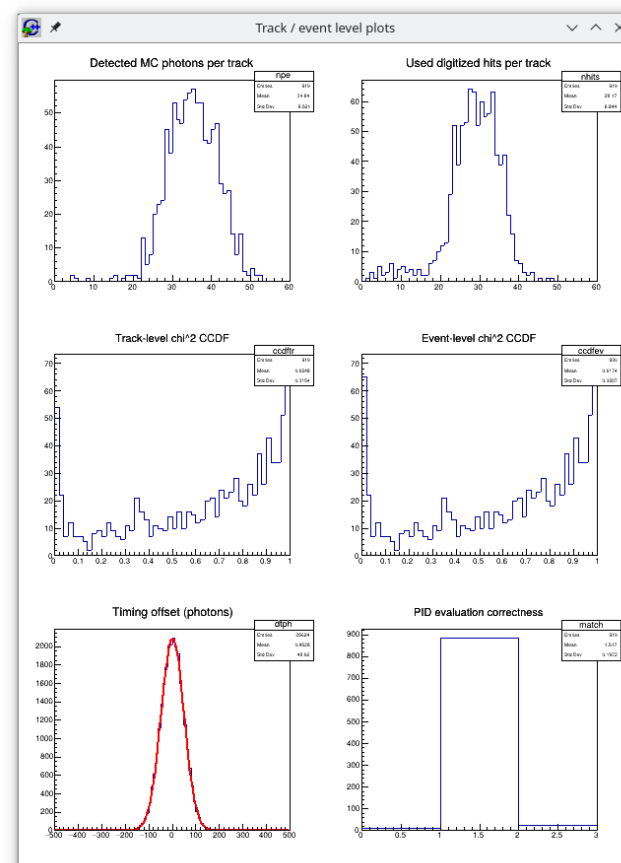
- A dRICH-like geometry
 - Spherical mirror
 - SiPM QE (yet HRPPD geometry)
 - Aerogel with $\langle n \rangle \sim 1.019$
 - C_2F_6 gas radiator
 - Tuned to produce focused rings
- Optics description
- IRT reconstruction shown to work *in a combined aerogel+gas configuration*



FRICH mockup implementation

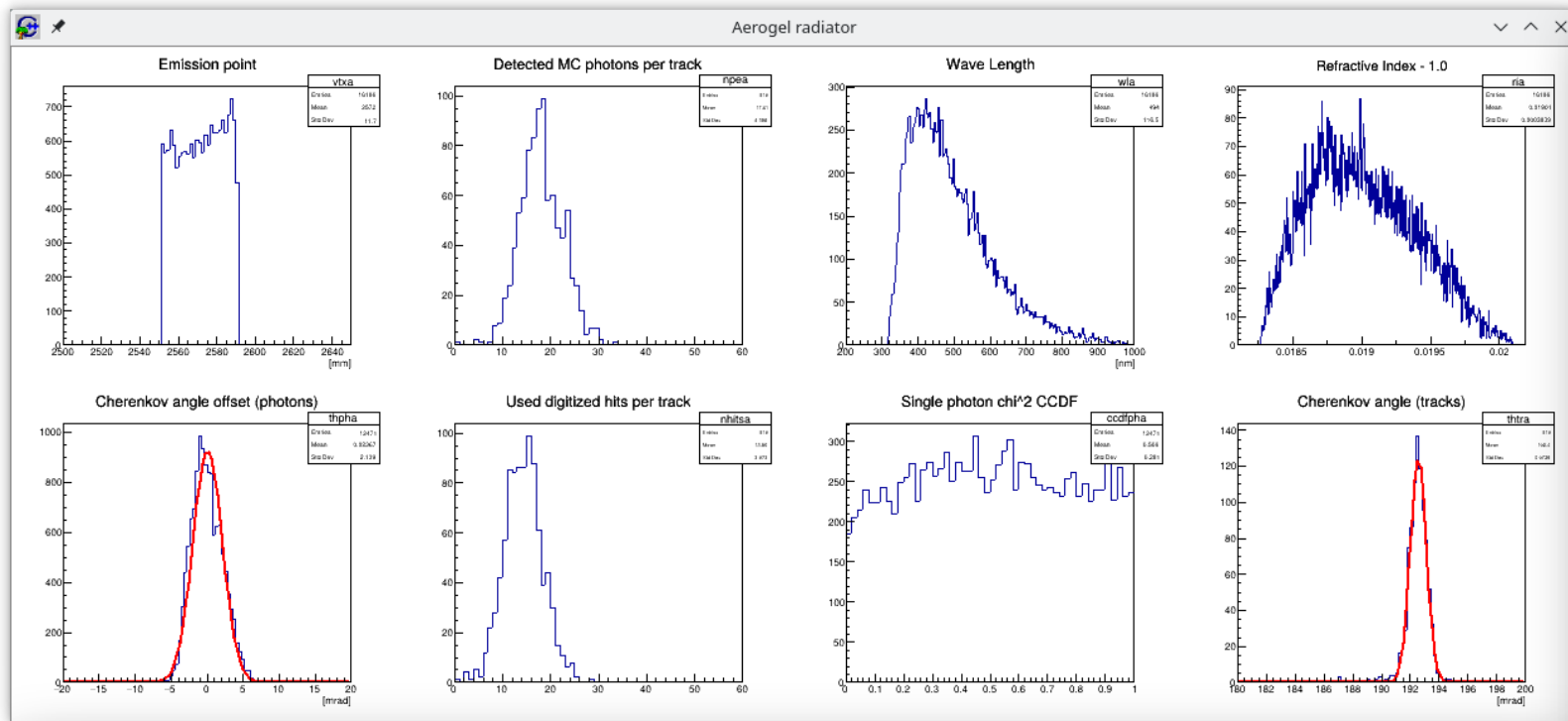


Digitized hit map: direct hits, gas, aerogel



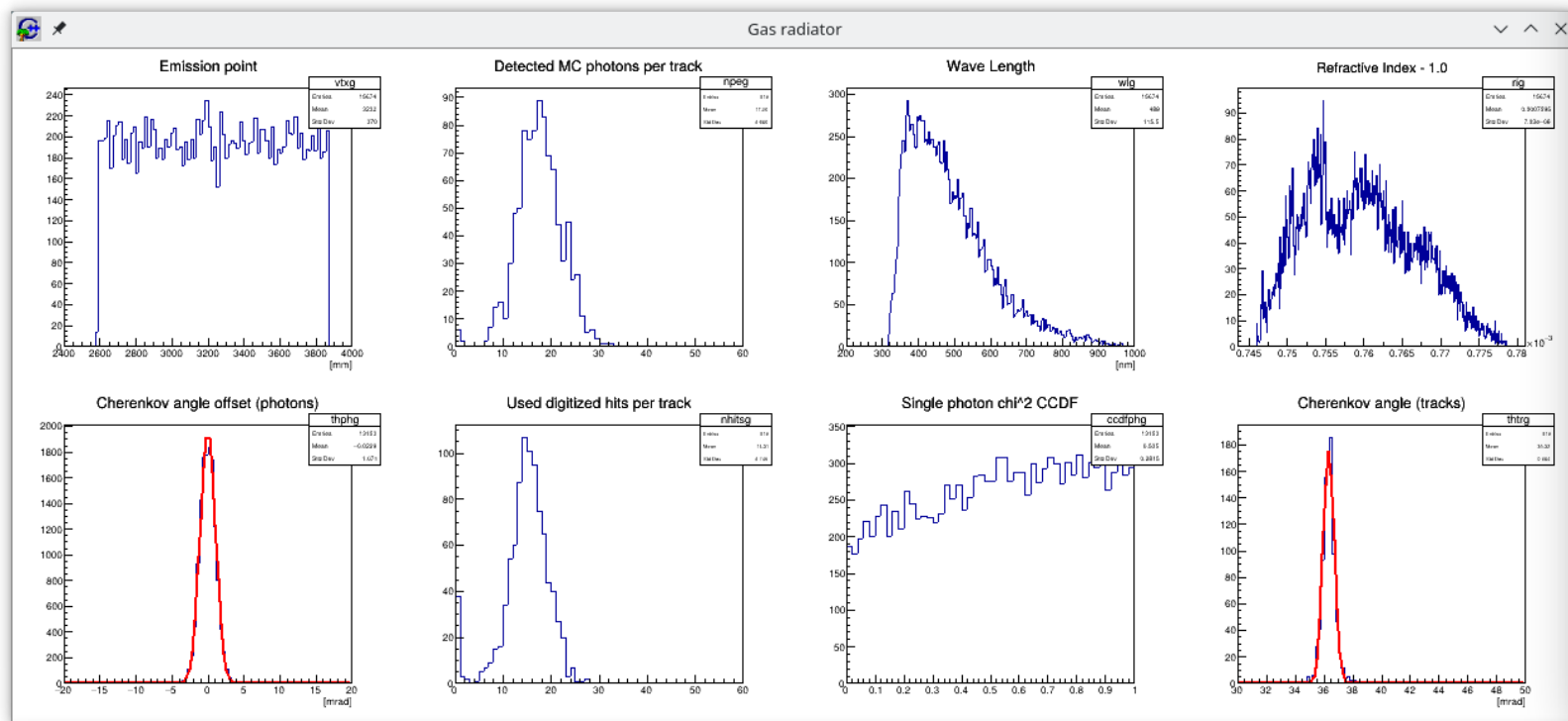
Combined IRT pass plots

FRICH mockup implementation



Aerogel radiator portion of the evaluation plots

FRICH mockup implementation



Gas radiator portion of the evaluation plots

Next steps

- Complete JSON config file parser
- Copy over the contents of a *CherenkovEvent* structure into PODIO fields
- Write a template of this PODIO output parser
- Finalize pfRICH geometry (without pyramid mirrors, yet usable for background studies)
- Make a proof-of-principle dRICH demo version with IRT optics generation
- ElCrecon IrtInterface.cc + IRT library debugging (multi-particle case, etc)
- A separate digitization step
- Coupling to CentralCKFTracks rather than Reconstructed...Particles?