Simulation codes for Hall C TCS

Status update

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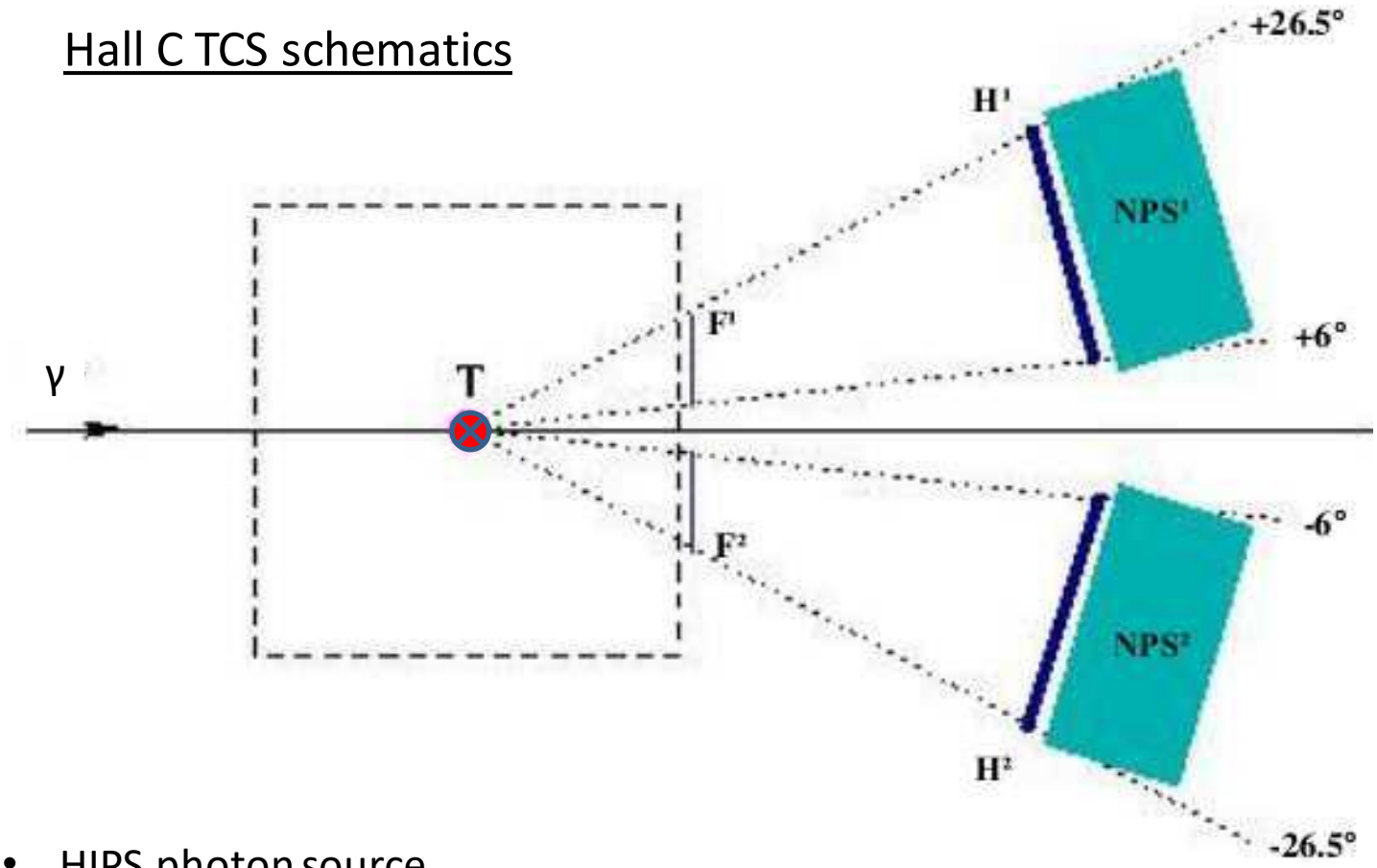
LOI on the TCS experiment in Hall C was presented to PAC43 In 2015.

Got overall positive response.

Prepared for development of a proposal for PAC45 In 2017.

Decided to postpone for various reasons until next year.

Hall C TCS schematics

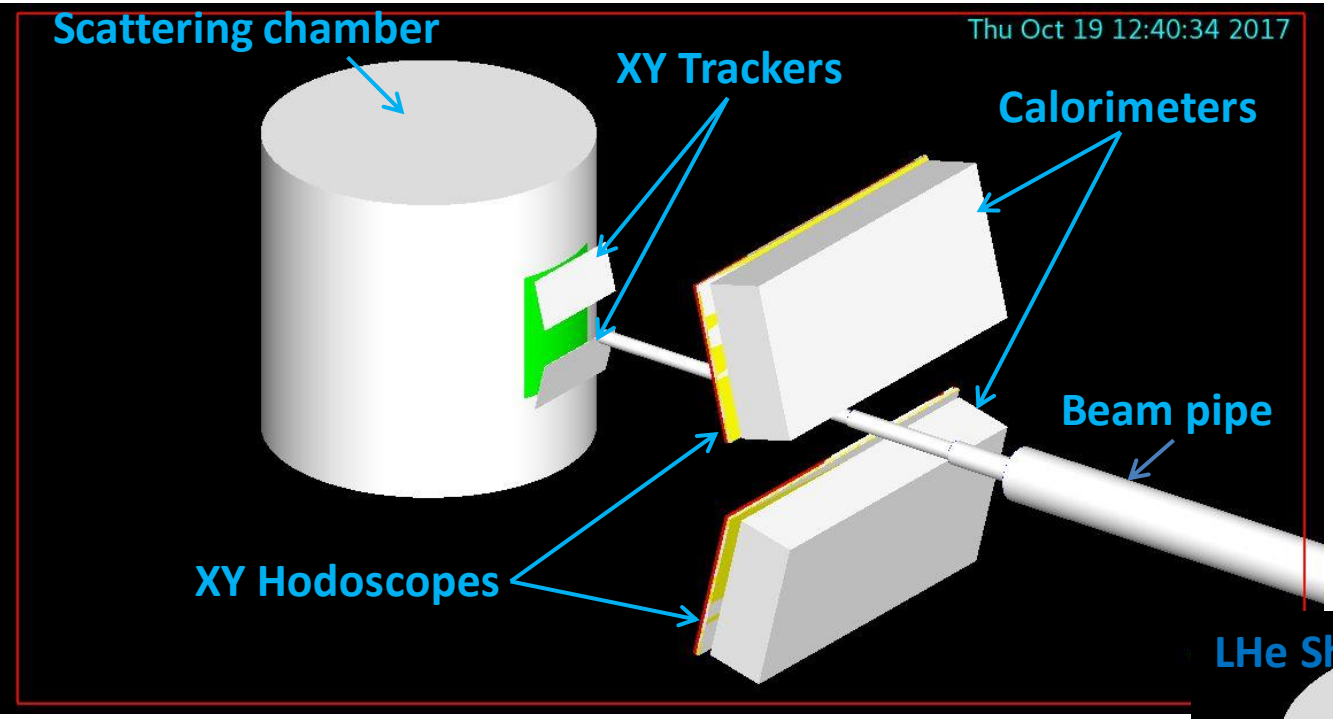


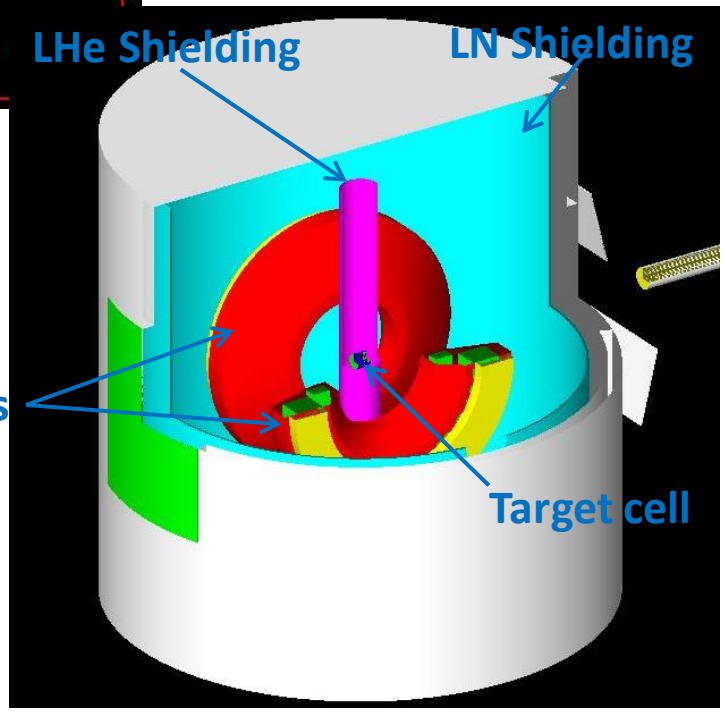
- HIPS photon source
- Transversely (horizontally) polarized UVA target
- Simultaneous detection of recoil proton and decay leptons
- Sensitive to GPD E (OAM of partons)

4 simulation codes on hand:

1) DDVCS/TCS Generator from M.Boer
   - Current version 3.0 posted in *https://hallaweb.jlab.org/wiki/index.php/DDVCS_and_TCS_event_generator*
   - Target polarization implemented
   - Generated BH+TCS events used for acceptance studies
2) GenTCS From R. Paremuzyan
   - Generated BH events used for acceptance studies
3) A Root/C++ code for modeling detector's acceptance
   - No material, just acceptances
   - Fast, good for acceptance calc-s.
4) A Geant4 code to model detector responses
   - Construction coded in GDML
   - Can be used for studies of backgrounds, efficiencies, various strategies of analyses…

Geant4/Qt rendering of Hall C TCS setup

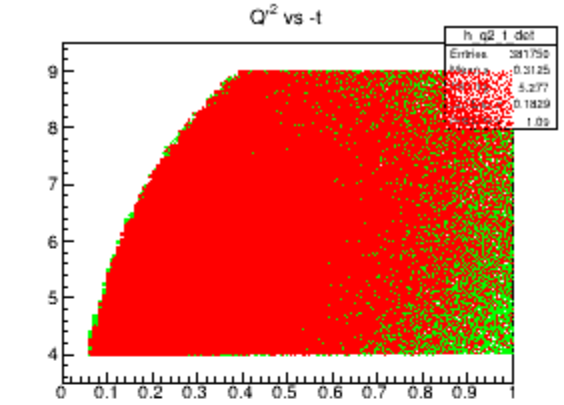


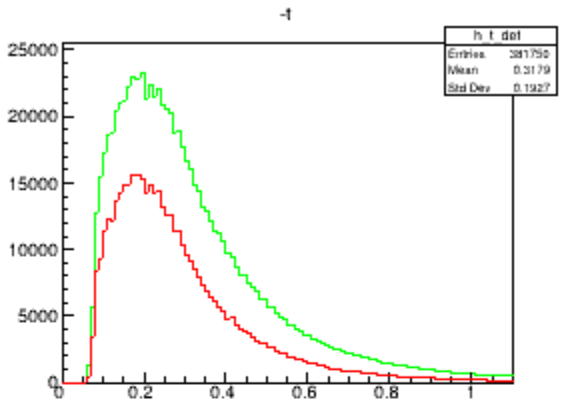


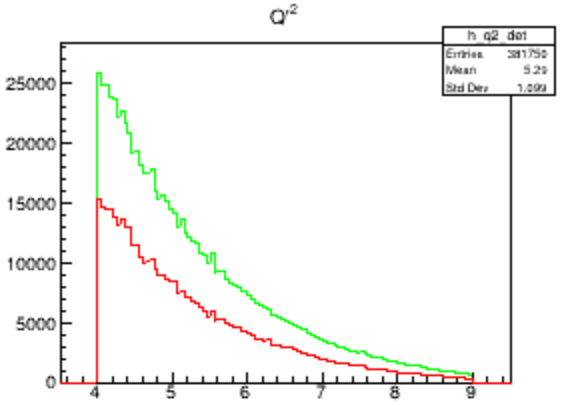
Revised construction of scattering chamber this spring and summer (thanks to J. Zhang)

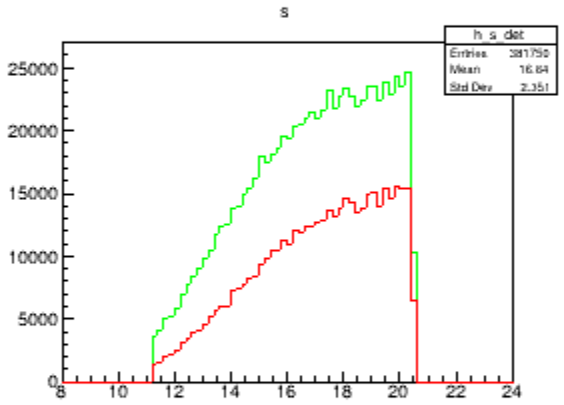
- Series of small changes in dimensions
- Added LN2 and LHe shields
- Corrected vertical size of exit window, caused change in vertical angular acceptance from ±26.5 ° to ±21.7 °!

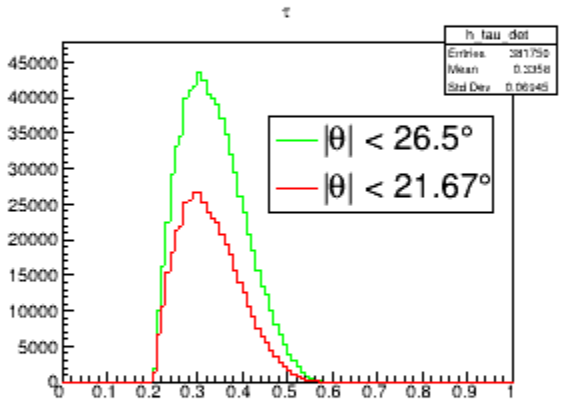
Kinematic coverage before and after corrections

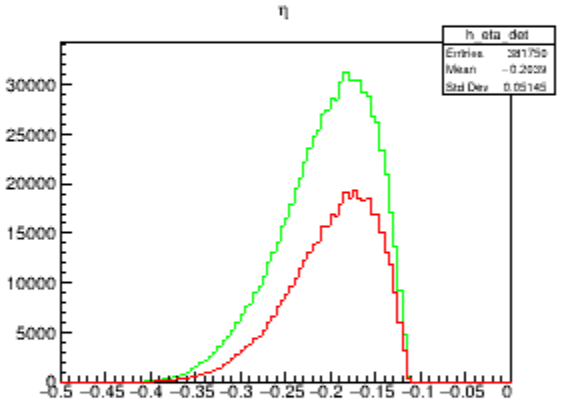


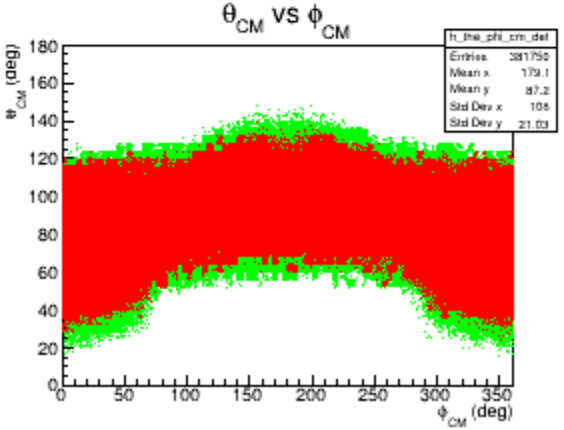


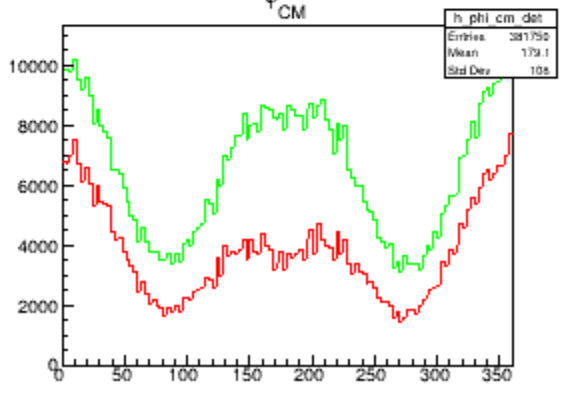


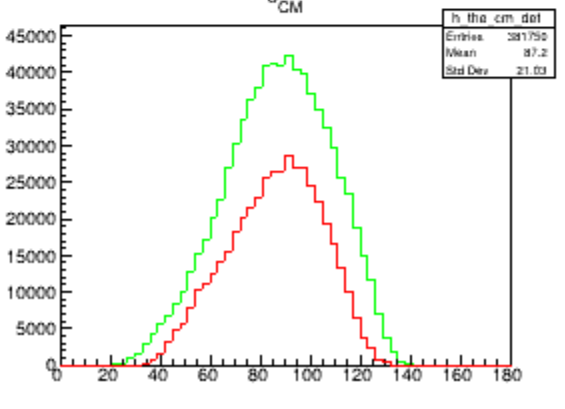












Kinematic coverage: C++/ROOT and Geant4 comparison