3DST: Questions and Issues

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4th DUNE ND workshop

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WILLIAM & MARY

CHARTERED 1693

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Questions and issues

- From January meeting
  - What are the angular/energy resolutions of the 3DST for photons, muons and electrons?
  - How well can it do neutrino-electron elastic scattering?
  - How big does the 3DST target have to be to do reasonably well with Pi0 topologies and neutrons?
  - Can it do something with neutron counting/angles?
  - Does it have to be in the magnetic field?
  - What is the complementary physics relative to the other trackers that can be addressed with the 3DST?

Questions and issues

- From January meeting
  - What are the angular/energy resolutions of the 3DST for photons, muons and electrons?
    - First results shown at the January meeting, updates since then.
    - Angular 10-20 mrad looks doable, with staggered cubes
  - How well can it do neutrino-electron elastic scattering?
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  - What are the angular/energy resolutions of the 3DST for photons, muons and electrons?
  - How well can it do neutrino-electron elastic scattering?
    - Needs an ECAL. No longer considered important?
  - How big does the 3DST target have to be to do reasonably well with Pi0 topologies and neutrons?
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  - How well can it do neutrino-electron elastic scattering?
  - How big does the 3DST target have to be to do reasonably well with Pi0 topologies and neutrons?
    - Photons: ~ $9X_0$ contains 95% of E in 90% of cases
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  - How big does the 3DST target have to be to do reasonably well with Pi0 topologies and neutrons?
  - Can it do something with neutron counting/angles?
    - Yes, a la MINERvA. Can tag 100 MeV+ neutrons with decent efficiency.
    - Depends on size / geometry of course.
  - Does it have to be in the magnetic field?
  - What is the complementary physics relative to the other trackers that can be addressed with the 3DST?

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  - Does it have to be in the magnetic field?
  - What is the complementary physics relative to the other trackers that can be addressed with the 3DST?
    - How does it fit in with the HPTPC or the STT?

Some new questions

- Is there a synergy between a side muon detector and 3DST?
- Is there a synergy between 3DST and the tracker's ECAL?
- Is there a synergy between the 3DST mission and on-axis monitoring?
- Is there a geometrical arrangement that works best with a cylindrical vessel?
- Is it redundant with the STT?
- What size is required to give "good" statistics & efficiency?
  - For physics studies
  - For on-axis monitoring
- Is it possible the 3DST would not be needed for the whole run?
  - Could it do its mission as a stand alone detector? In a B field?

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