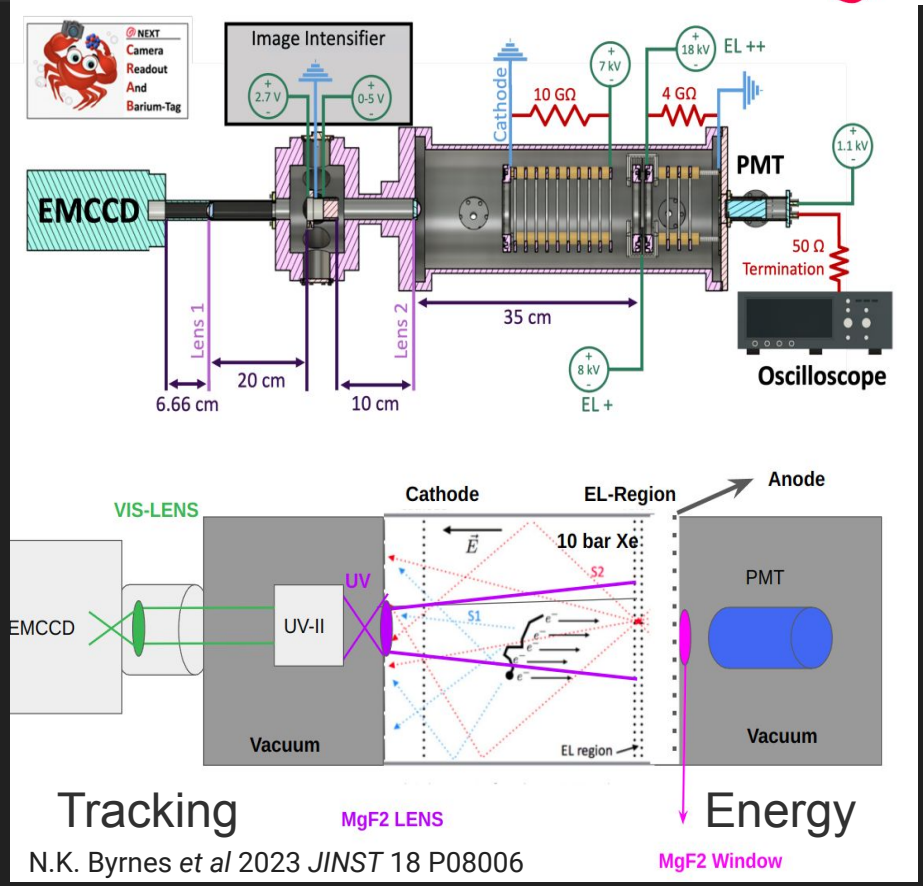
CRAB0 Prototype

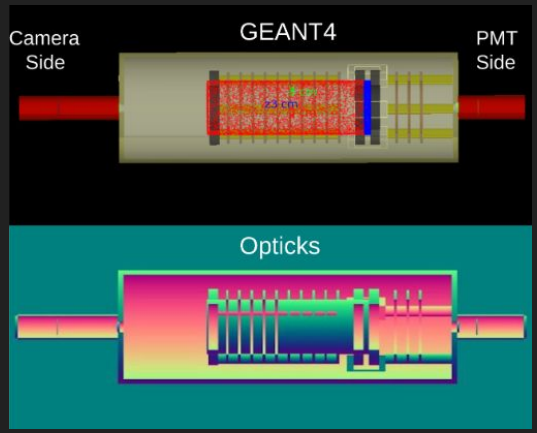
- An optical time projection chamber that is coupled with an VUV image Intensifier (II) and EM-CCD camera.
- Motivated by improving sensitivity for neutrinoless double beta decay in high pressure xenon TPCs like NEXT.
- S2 is amplified by electroluminescence.
- Snaps images of particle tracks
  - S2 light (172 nm) is focused to VUV II by a MgF2 lens.
  - VUV II amplifies and converts S2 photons to 540 nm.
  - 540 nm photons are focused to EM-CCD by an objective lens



N.K. Byrnes *et al* 2023 *JINST* 18 P08006

Simulation

- Opticks is used to simulate S1,and S2 photons of 5.4 MeV alpha particles in CRAB
  - Total photons produced can reach up to 160 M photons
- Opticks boosts simulation speeds 181 times over Geant4.
- Results are similar to Geant4.
  - Camera response of 3 alpha particles that are produced at different distances in field cage
  - Data, Geant4,and Opticks results are comparable



8 bar Xenon