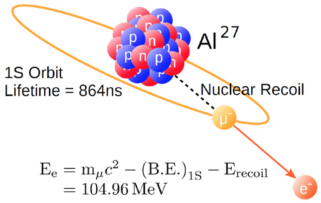
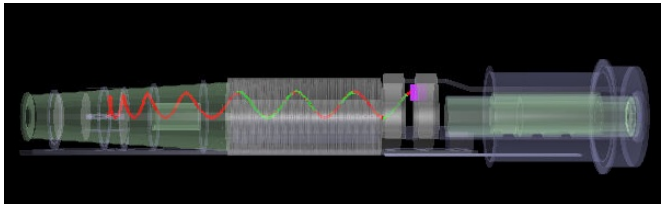
Mu2e Event visualisation Development
Using TEve and Eve-7

- The Mu2e experiment will search for the CLFV neutrinoless coherent conversion of muon to electron, in the field of an Al nucleus.
- It will examine ~ 10^{18} stopped muons in 3 years of running with an expected single-event sensitivity of ~ 3 x 10^{-17}.
- The expected signal is a monochromatic electron with an energy about 105 MeV. If observed, it would be a clear evidence for BSM physics.



- A custom made display with GUI has been developed specifically for Mu2e using TEve and an online version is being developed using Eve-7, both ROOT based 3-D event visualisation frameworks.
- They are crucial for monitoring and debugging during live data taking, assisting in Offline analysis as well as for public outreach.

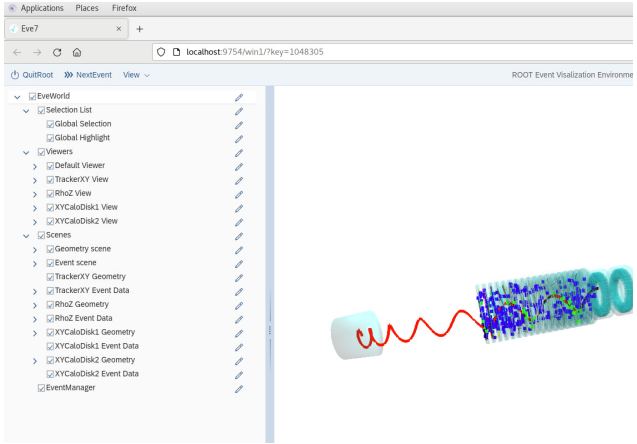


Conversion electron 3-D Event Display,
Red : MC truth track, Green : Reconstructed track

- For the 3D visualisation, a GDML file containing the Mu2e geometry is created in Mu2e Offline and directly imported to TEve.
- TEve maintains access to the raw art file making it convenient to go between the raw and reconstructed data within the display browser. It has event selection and navigation tabs.
- Reconstructed data like the tracks, hits and clusters can be displayed within the detector geometries upon GUI request.

- True Monte Carlo trajectory of particles traversing the muon beam line can be displayed in all the solenoid regions of Mu2e giving a complete illustration of the experiment.
- Tracks are coloured according to their particle identification and users get to select which trajectories to be displayed. This is a useful feature to distinguish the conversion electron signal track from the background trajectories.
- Reconstructed tracks are refined using a Kalman filter. The resulting tracks can be displayed alongside truth information, allowing visualisation of the track resolution.
- The user can remove/add data based on energy deposited in a detector or arrival time.

- Most of the above mentioned features have been migrated to the online event display as well, which allows remote access for live data taking and for multiple users to interact with the display simultaneously .



Online display with an event containing the conversion electron and other background hits