

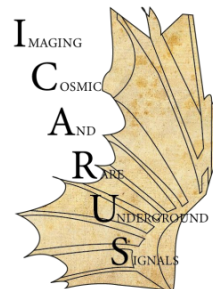
Report from a Seconded Researcher

MidTerm Review of SENSE

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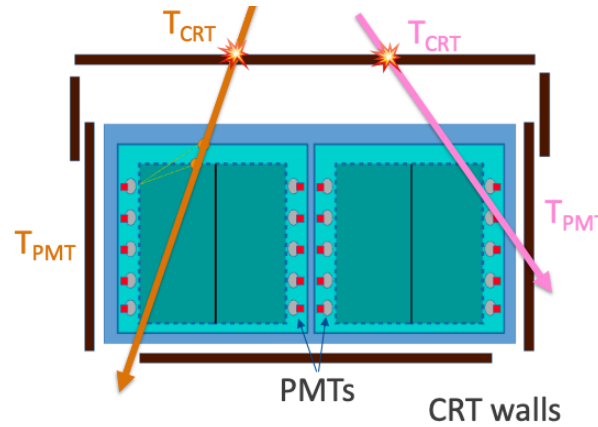
Introduction

- I joined University of Pisa, INFN Pisa in April 2021 for my PhD research under the *Grant Agreement no.858199 of the European Union Horizon 2020 Programme, Marie Skłodowska-Curie Actions (MSCA), Innovative Training Networks as a part of the INTENSE project.*
- I work on the Mu2e experiment. It will look for the charged lepton flavour violating process of neutrinoless muon to electron conversion in the field of an aluminium nucleus.
- My doctoral thesis is entitled “A data-driven method to estimate the antiproton background in Mu2e”.
- I joined the ICARUS experiment in September 2022. I am studying the track splitting and stitching efficiency at the cathode using CRT-PMT match.
- I plan to submit my thesis by March 2025 and further continue as a Post-doc at the University of Pisa, working on the ICARUS experiment.

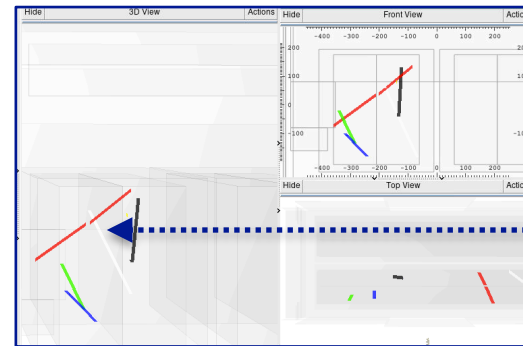


Track Splitting in ICARUS (SENSE Secondments)

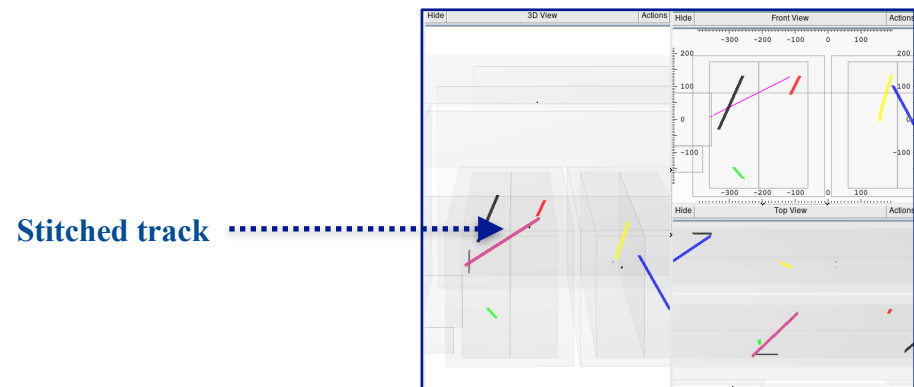
- Bends in the cathode can result in track misalignment and thus track splitting.
- In this study we use events with a cosmic muon entering from the Top CRT, crossing the cathode, producing a PMT flash, then exiting out the Side CRT.
- We have a CRT-PMT matching algorithm and we specifically select events with a Flash Classification = 3.
- The goal is to understand the track misalignment at the cathode and evaluate the track stitching efficiency of the reconstruction algorithm.



ID	Match classification
0	No CRT Match
1	1 entering Top CRT
2	1 entering Side CRT
3	1 entering Top CRT and 1 exiting Side CRT
4	1 exiting Top CRT
5	1 exiting Side CRT
6	Multiple entering Top CRT
7	Multiple entering Top CRT and multiple exiting Side CRT
9	Other



Split track



Stitched track

Future

- Submit the thesis by March 2025.
- Continue working on neutrino physics as part of the ICARUS collaboration.
- Be present at Fermilab for hands-on work on the ICARUS detector and perform relevant analyses.

