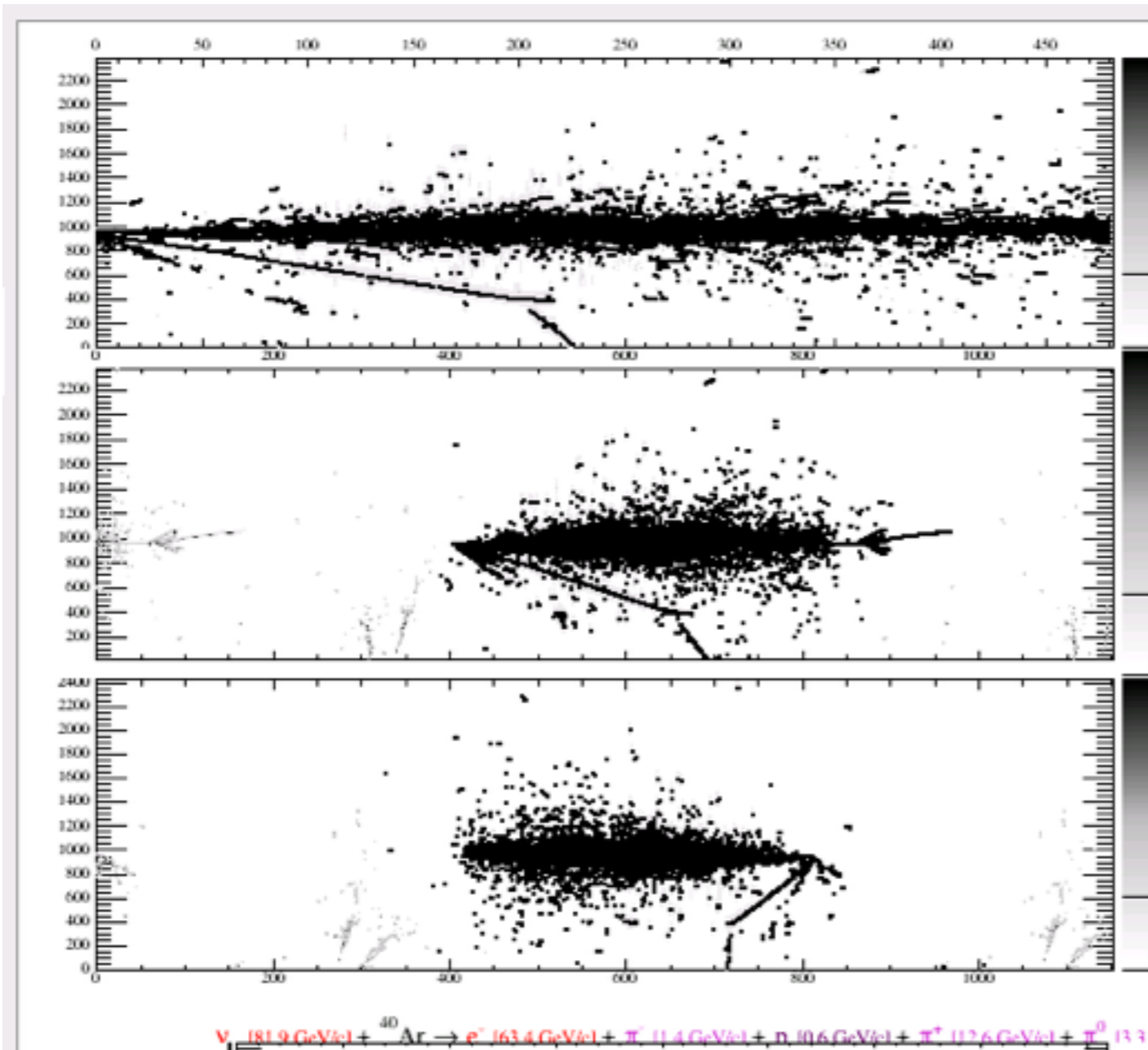# Prepare for DUNE MCC 5.0

T. Yang/FNAL
Nov, 17, 2015

Introduction

- DUNE would like to launch a new MC production soon - MCC5.0

- Include simulation of neutrino interactions and single particles in the far detector and cosmics in the 35t.

- We would like to use this week's larsoft release for MC production.

- Dorota Stefan/Robert Sulej: TrackShowerSplitter, vertex reconstruction

- Mike Wallbank: Track/Shower separation

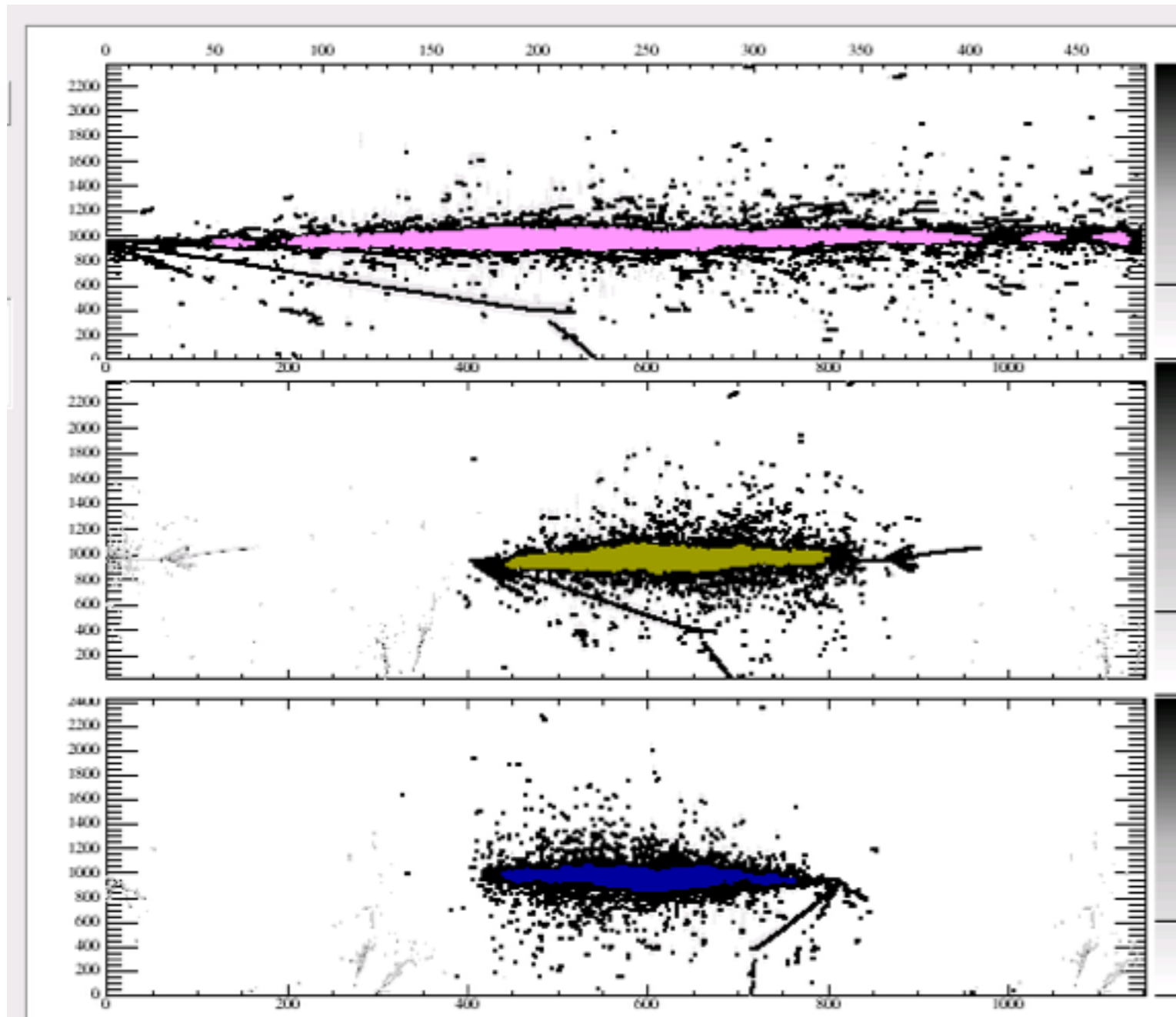- Gleb Sinev: supernova neutrino generator
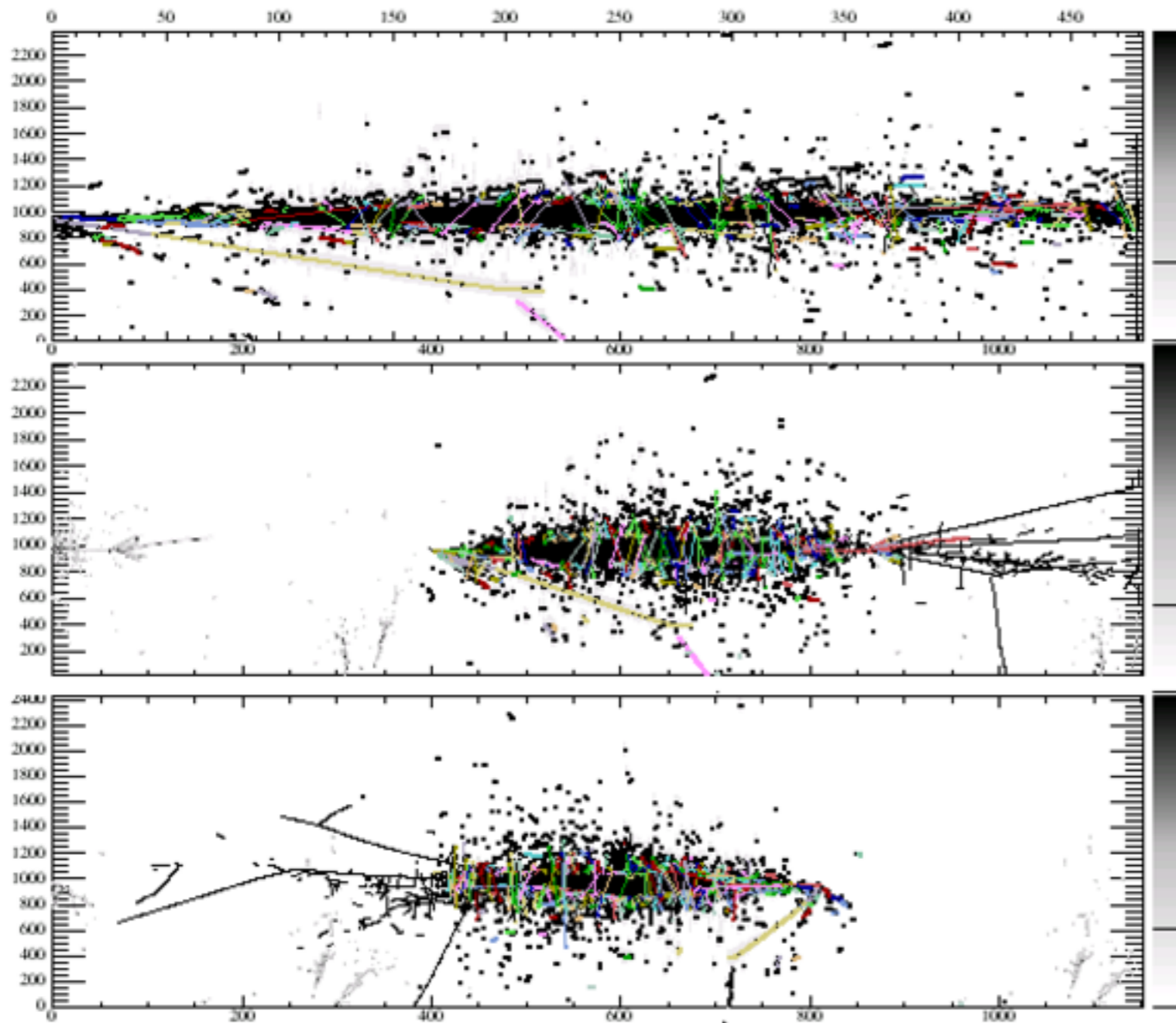
TrackShowerSplitter

Dorota Stefan

- The problem: tracking can be slow in the very dense shower region.

- The solution: tag hits in the dense region so that the track reconstruction can ignore those hits.

Tag hits in dense region

- Dorota and Robert implemented TrackShowerSplitter in larreco/ClusterFinder.

- It finds dense regions of hits in certain radius. Radius and number of hits is big enough to ensure we remove regions of hits only in very dense cascades.

- It creates clusters in each view to include hits in a dense region.

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Track Reconstruction

- PMAlgorithmTrackMaker is configured to configured to ignore hits in the dense region.

- There are still tracks reconstructed near the vertex and on the edge of the shower.

- This particular event used to take days to reconstruct. Now it takes a few minutes.

More details

- The code is in a feature branch feature/dstefan_TrackShowerSplitter: request merging.

- To use it: #include "trackshowerhits.fcl"

- trkshowersplit: @local::standard_trackshowerhits

- physics.producers.trkshowersplit.HitModuleLabel: "lineclusterdc"

- physics.producers.trkshowersplit.Segmentation2DAlg.DenseHitRadius: 5.0

- physics.producers.trkshowersplit.Segmentation2DAlg.DenseMinNHits: 100

- physics.producers.trkshowersplit.FindMoreShowers: false

- physics.producers.pmtrackdc.HitModuleLabel: "trkshowersplit"

Vertex reconstruction

- Robert Sulej has implemented the vertex reconstruction in the PMAlgorithmTrackMaker. It is in a very advance stage.

- Robert is still tuning the vertex reconstruction to iron out a few issues.

- Robert may still need one more day to finalize his code. We would like to request holding off tagging the larsoft release until end of tomorrow (Wednesday).