

Computing needs for low-energy physics

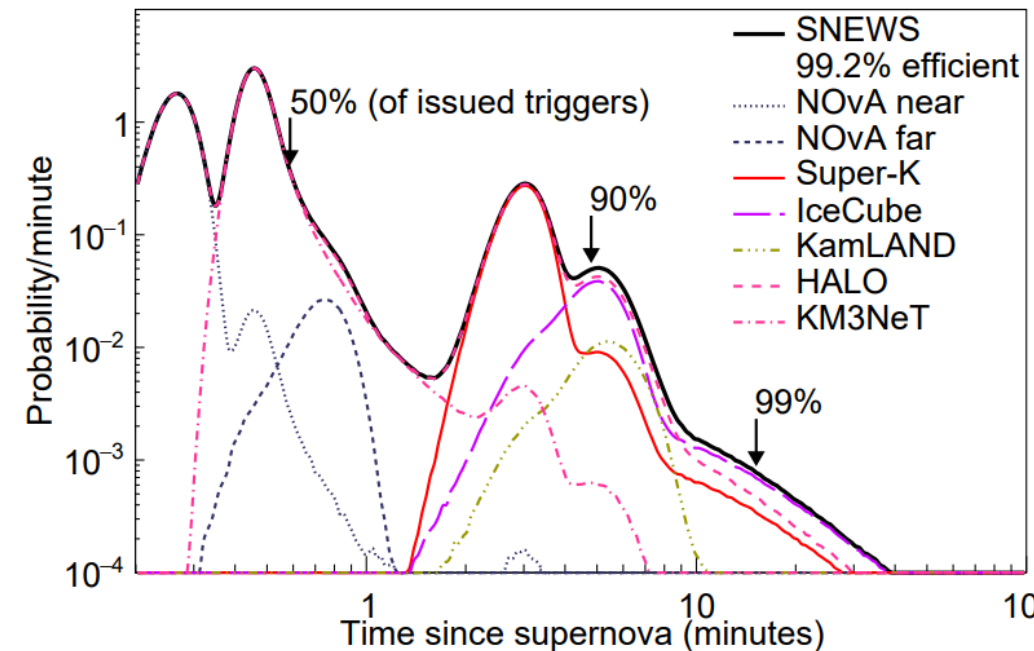
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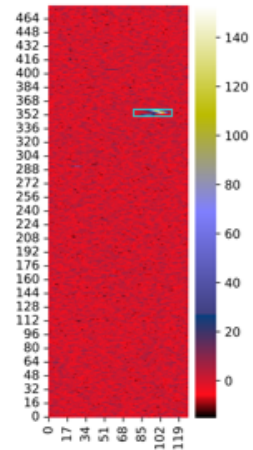
Problem 1: supernova data rates

- The raw data rate for each FD module is ≈ 1.5 TB/s
- A 100-s SN trigger transfers data out of the mine at 100 Gb/s
 - 4×1.5 TB/s \times 100 s / (100 Gb/s) = 13 hrs!!!
 - DAQ requirement is 24 hrs
 - Must supply pointing info within a few minutes to contribute to SNEWS
- See Mike Wang's talk at May collaboration meeting [on indico](#)

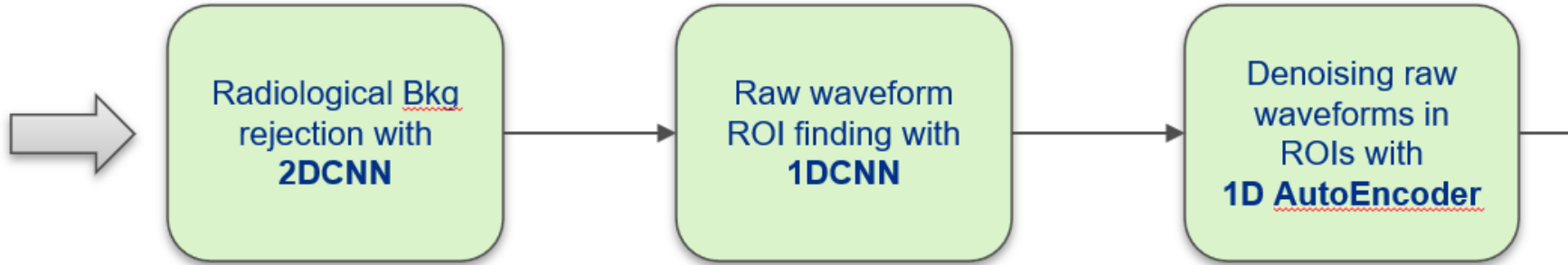


Strategy for fast pointing determination: algorithms

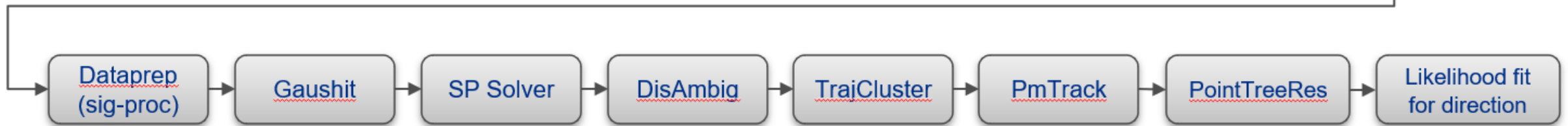
ML-based *in situ* data reduction



Raw wire plane data



network



“Offline-like” reconstruction and pointing analysis

Scope of the problem

- DUNE SN physics is only tractable with ML processing underground
 - Unique for software development

	Raw output processing	ML-processing underground
Total data rate	48 TB	0.000151 TB
Transfer time	13 hrs	12 ms
Processing time	88 hrs	0.06 hrs (3.5 min)

- For analyzers, we'll need convenient access for online-type computing environments (FPGA + FE electronics)

Problem 2: resources for background simulation

- Active ticket for LE MC production: $\sim 3e6$ events in $1x8x6$
 - Sim time: $3e6 \times (2.25 \text{ ms}) \times (24/200) = (15 \text{ hrs}) = 2e-5$ nominal exp.
 - With using mature tricks to simulate only interesting events (i.e. events with a true neutron capture in them) – improved to $2e-3$
 - Need orders of magnitude to fully understand bkg combinatorics
 - Sim/data overlays not possible here – signal contaminates data
- Any ideas?