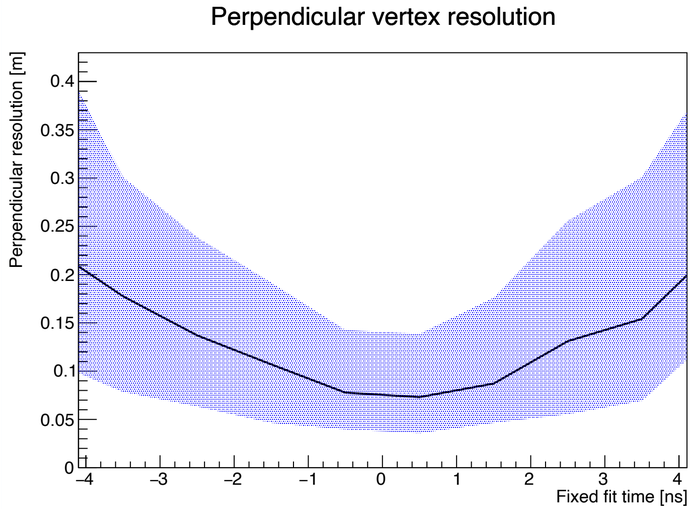
Vertex fit

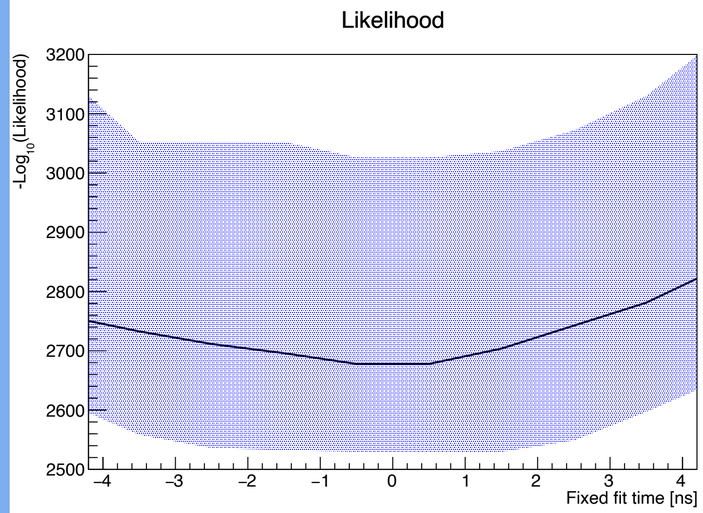
JSirene vs Toy

Thijs van Eeden - 2020-10-30

Toy MC

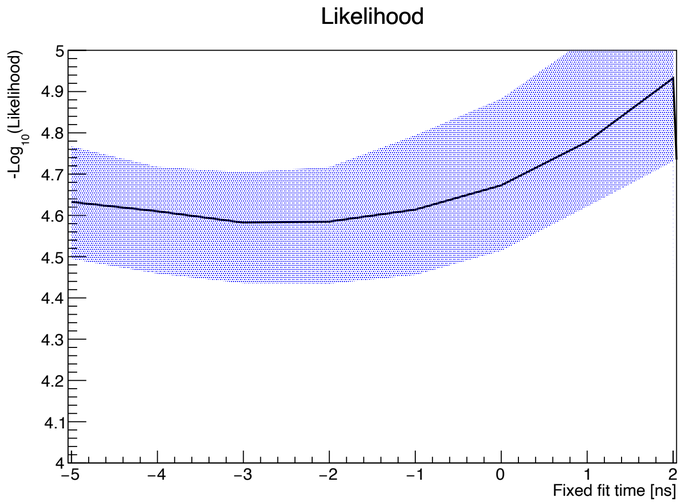
JSirene

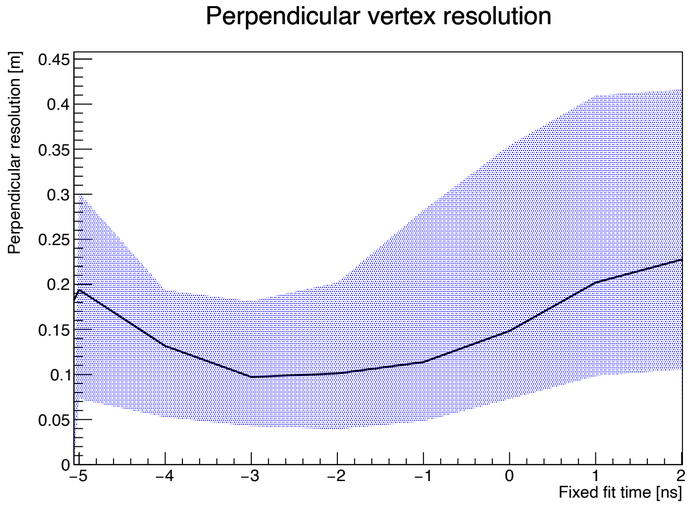




- 100 TeV shower events
- Every event is reconstructed with different starting times

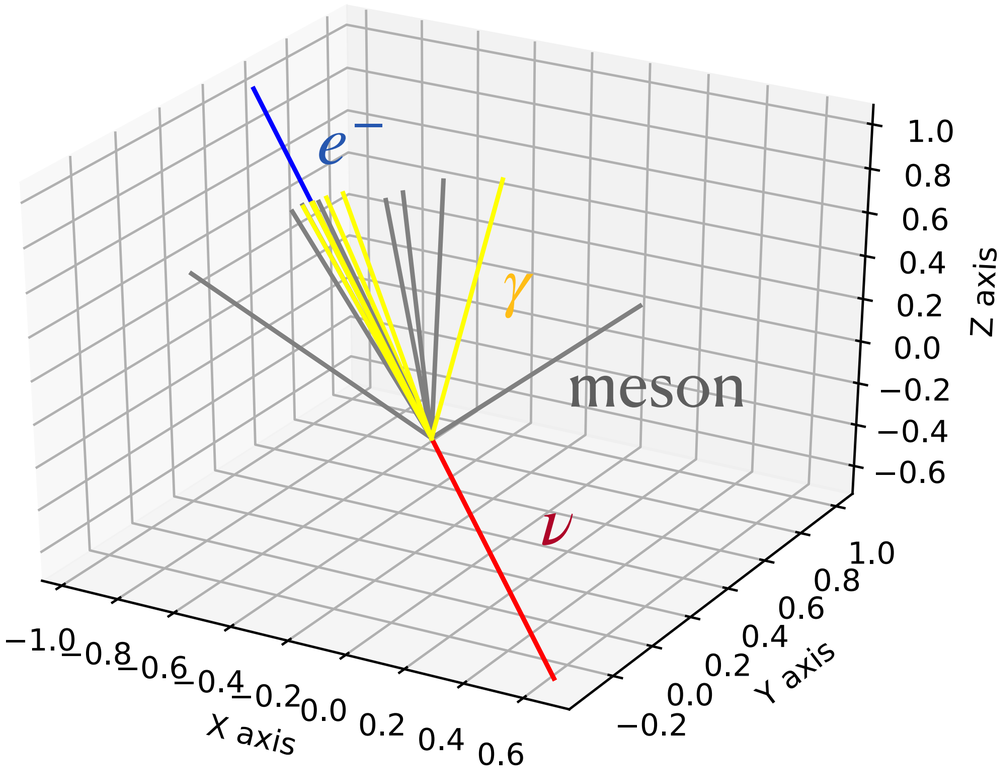
Why do JSirene files gives the best likelihood and resolution at negative times?





Toy MC vs JSirene

- In Toy MC we assume 1 elongated shower with 1 energy and direction
- JSirene loops over all mc_trks in file, resulting in multiple showers with different energies and directions



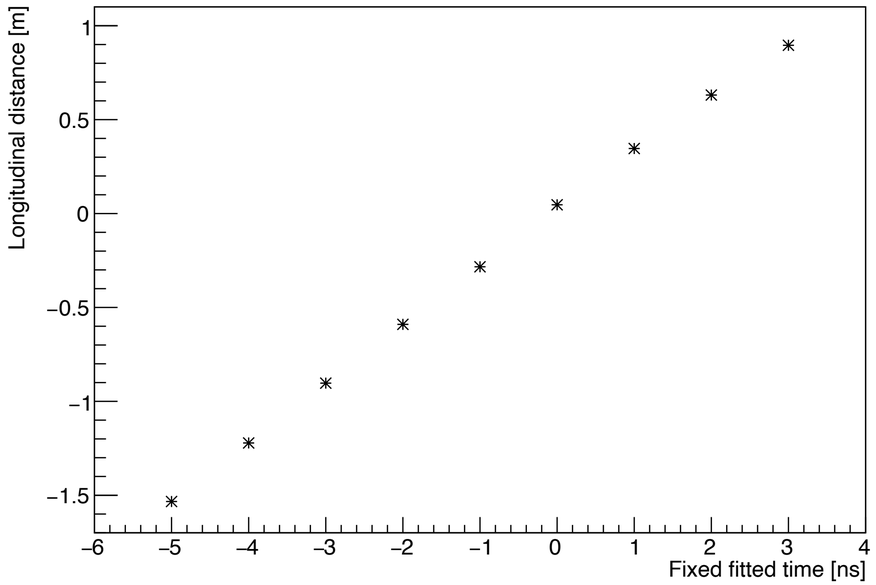
To do: take a MC event that shows the best likelihood at negative times and generate hits using toy MC

Event 2090

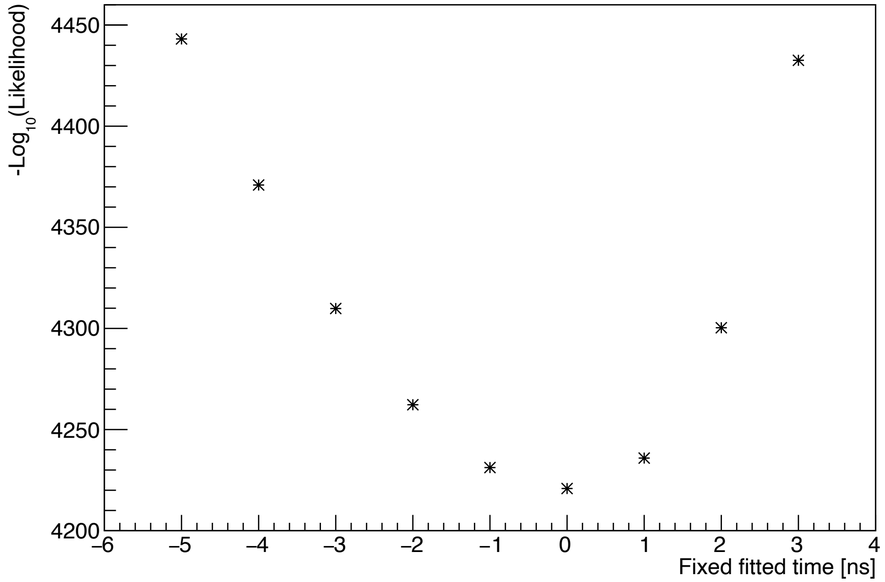
Hits pulled from evt.mc_trks[0] using toy MC

- Shows expected behaviour
- What if we generate hits from all light producing mc_trks in event?

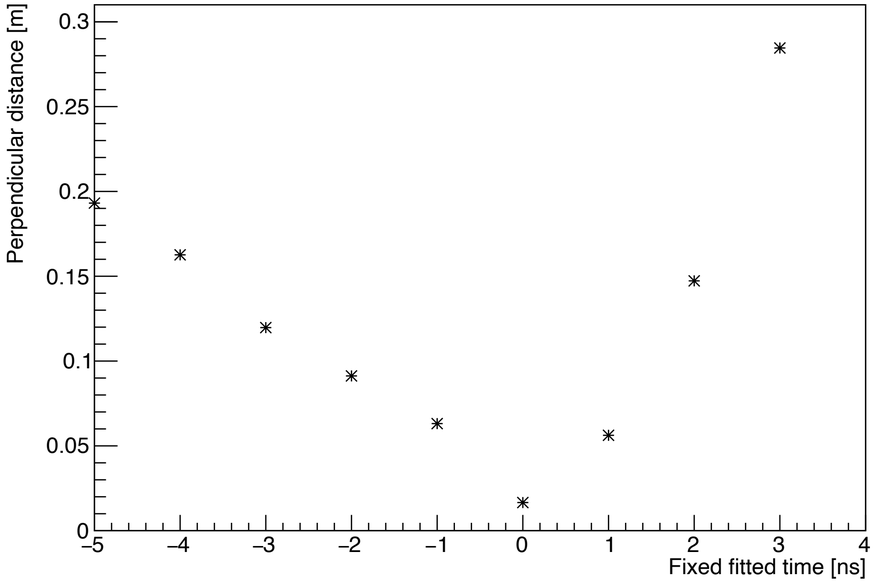
Longitudinal distance versus fitted time



Likelihood versus fitted time



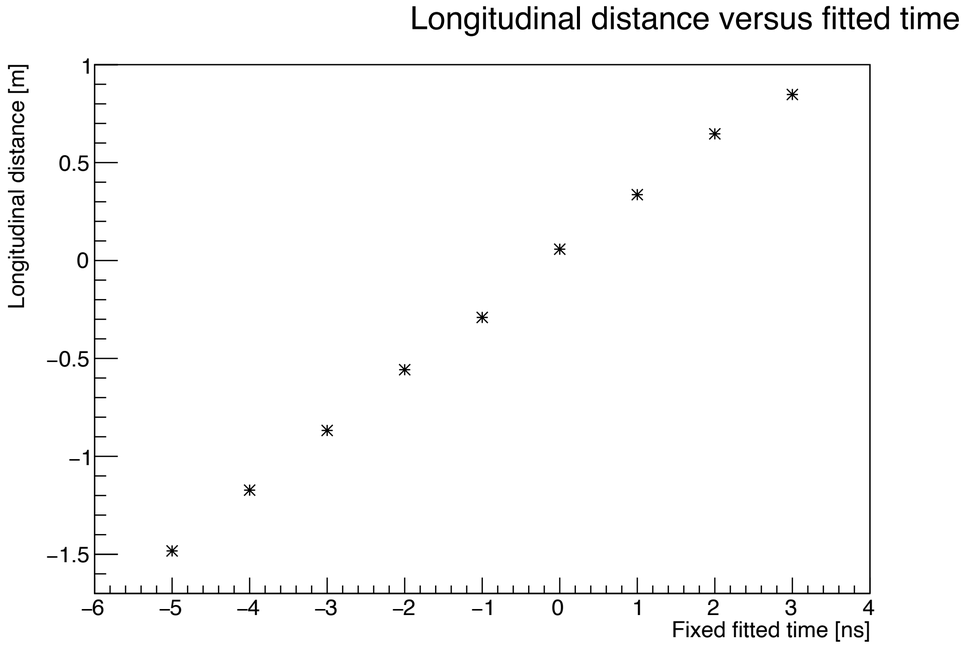
Perpendicular distance versus fitted tim

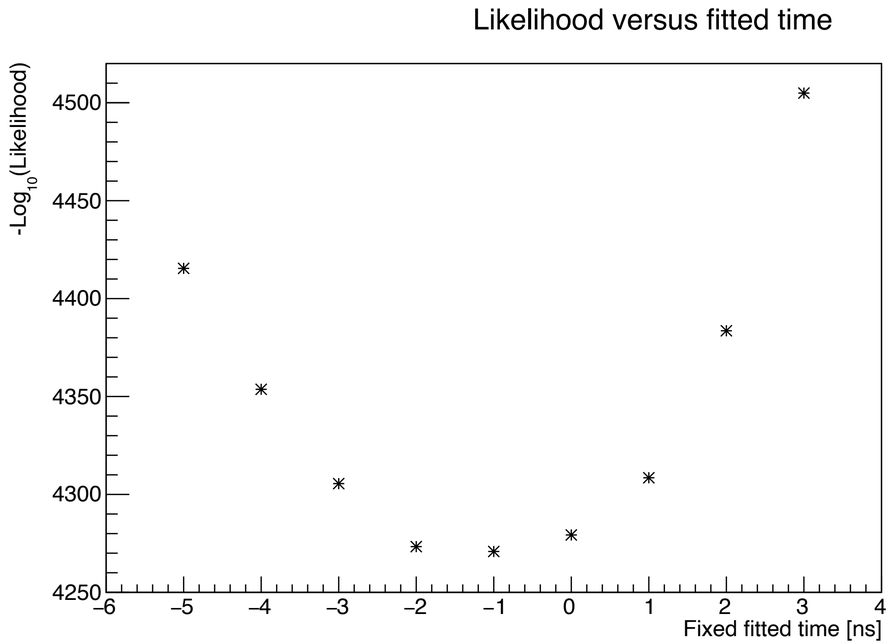


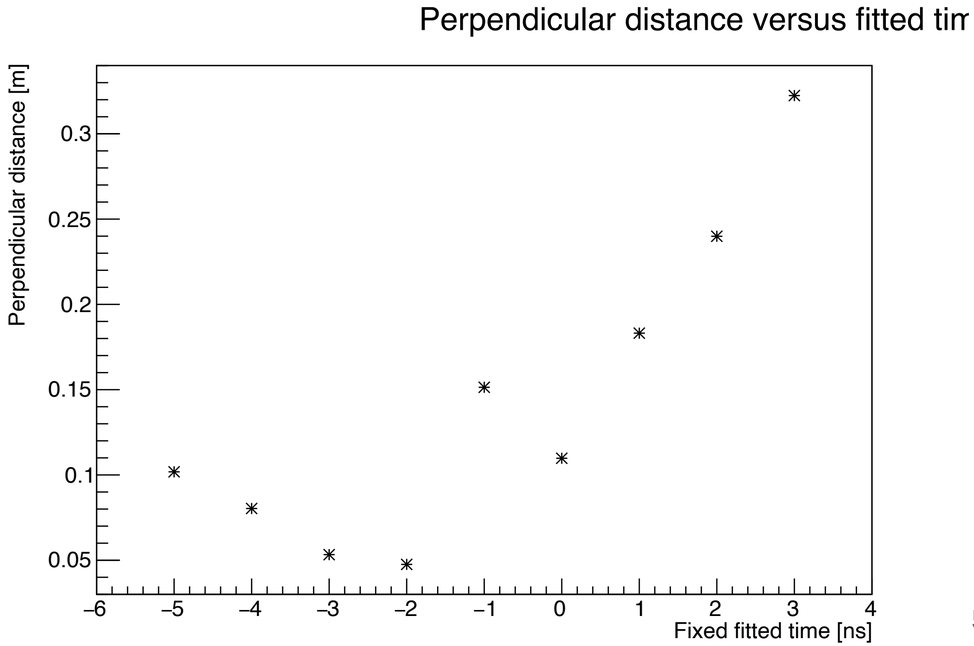
Event 2090

Hits pulled from all evt.mc_trks using toy MC

- Minimum likelihood and perpendicular resolution is now at negative times
- Which particles make this happen?







Event 2090

Hits pulled from all evt.mc_trks using toy MC

- Light is produced from tracks with different directions
- Light is produced from tracks with lower energy than the primary neutrino —> Smaller shower profiles

What happened for event 2090?

One hit in the backward direction originating from a meson was impossible according to PDF for the neutrino hypothesis