# Geometry Calibration of the IceCube detector using Muons

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- Using inter-string flasher calibration with strings 120 meters apart, we can estimate x and y positions to within a few meters.
- Muons travel throughout the entire detector volume producing photons hiting many DOMs (digital optical module)
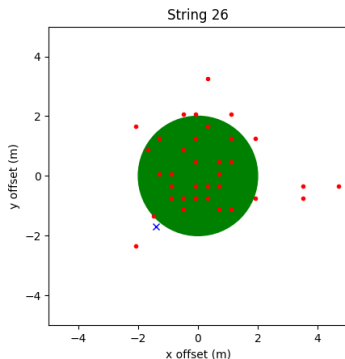- Can we use our reconstruction of muon tracks to calibrate our DOM positions?

Finding positions with the help of likelihoods.
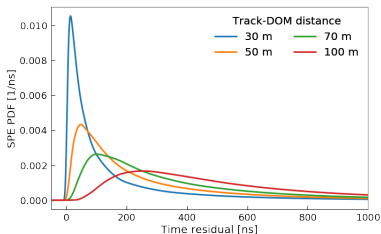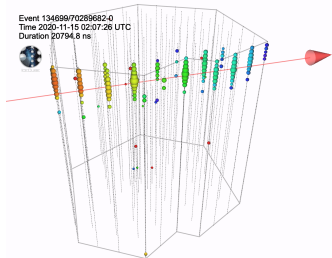
Delta Log Likelihood, 1 event
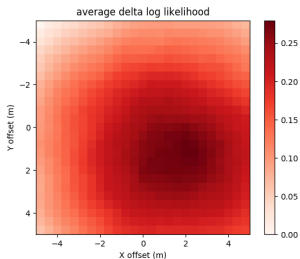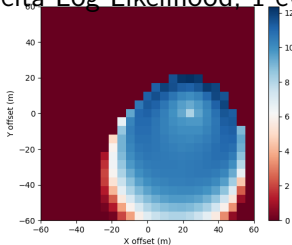
Monte Carlo Proof of concept

Blue x at (-1,6; -1,8) marks the position of the DOMs that the reconstruction assumes as a starting point.

Green circle shows the area within 2 meters from the true DOM positions (0,0) in simulation.

Red dots are where individual DOMs end up at after 3 iterations.

- Even with the entire detector scrambled and low statistics the algorithm manage to improve on positions.
- Next is to find what accuracy I can find with more statistics.