Direct Reco Upgrade Progress – Cherenkov investigations

Friday meeting 12-03-2021

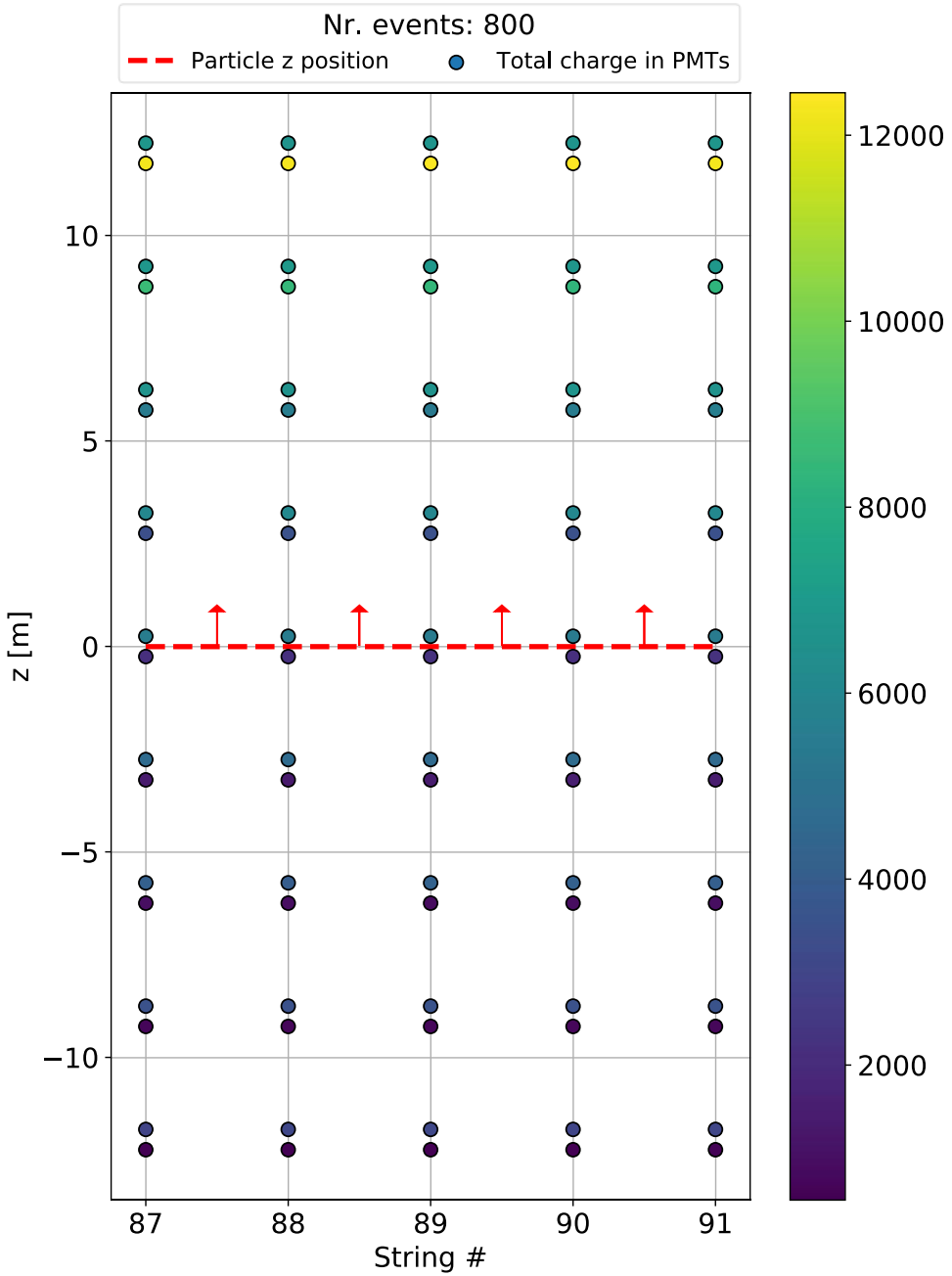
Jonathan Jegstrup

UNIVERSITY OF COPENHAGEN

Last Friday

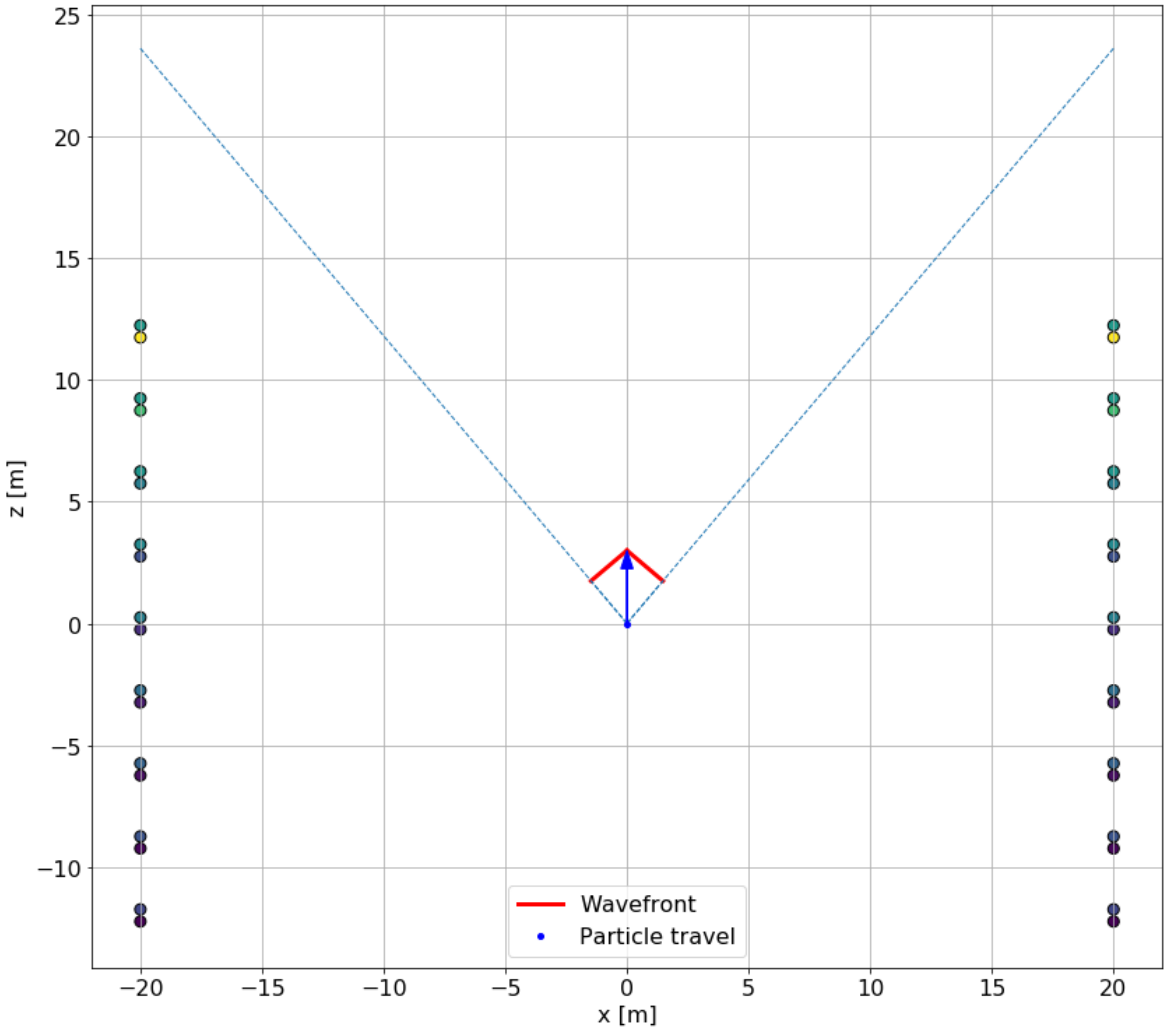
- For a few weeks there has been some apparent PMT asymmetry

- The plots suggested that it might be the Cherenkov Cone which results in the highest DOMs getting most charge



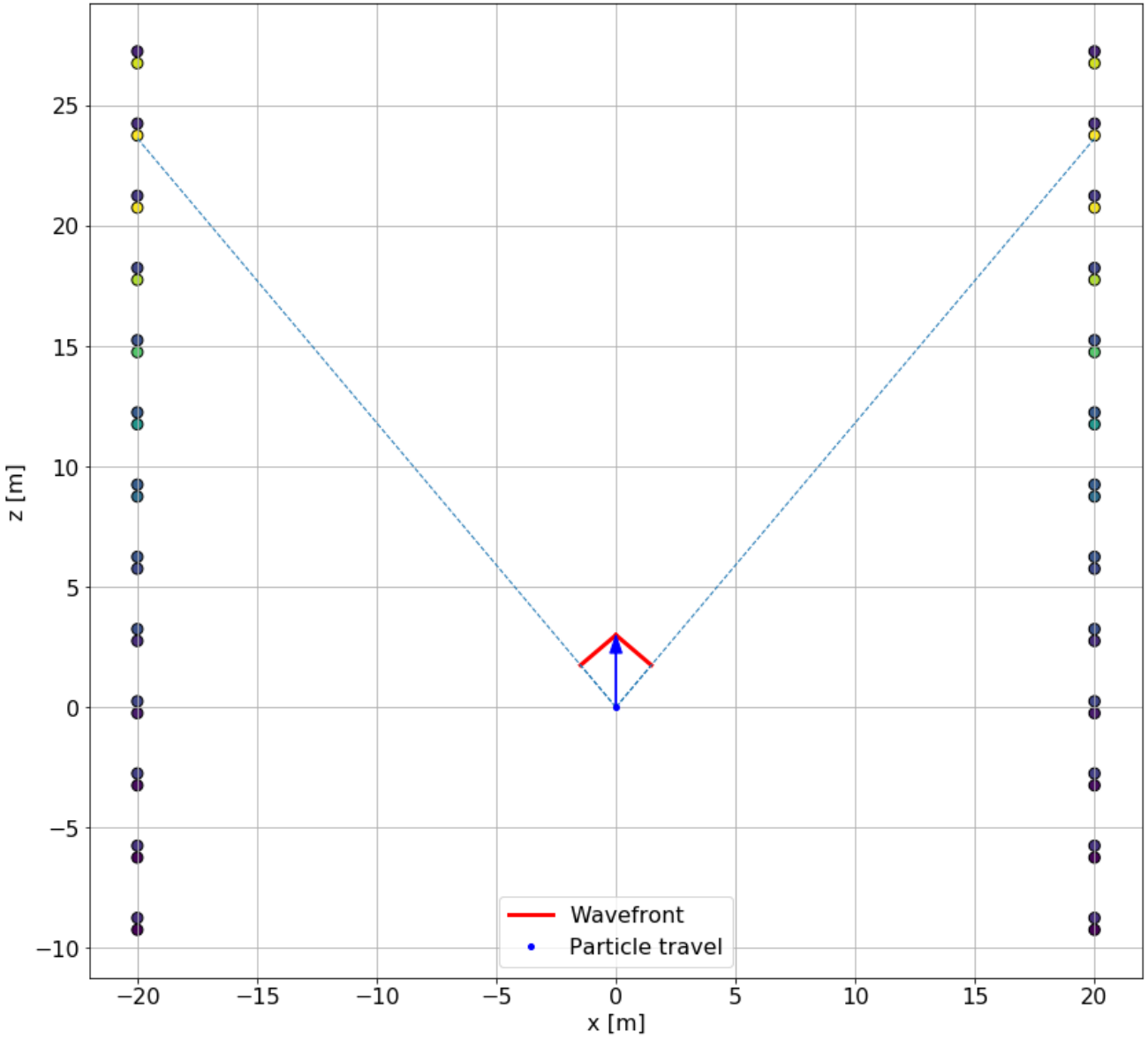
Cherenkov Cone investigation [1/3]

- This shows a 50 GeV electron that has traveled in 10 ns
- I have assumed the refractive index to be 1.31 (from Wikipedia of refractive index of ice)
- The plot clearly shows the Cherenkov cone going well over the highest DEggs
- Solution: Make a larger detector!



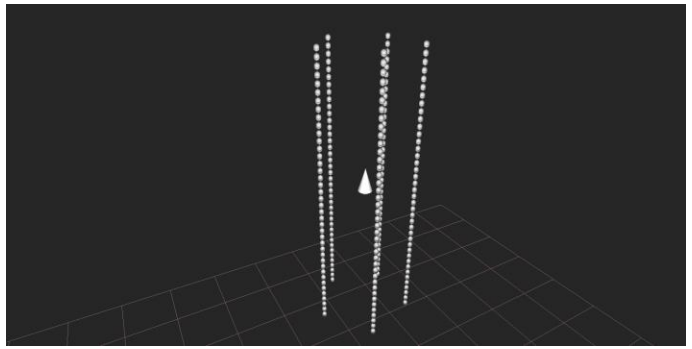
Cherenkov Cone investigation [2/3]

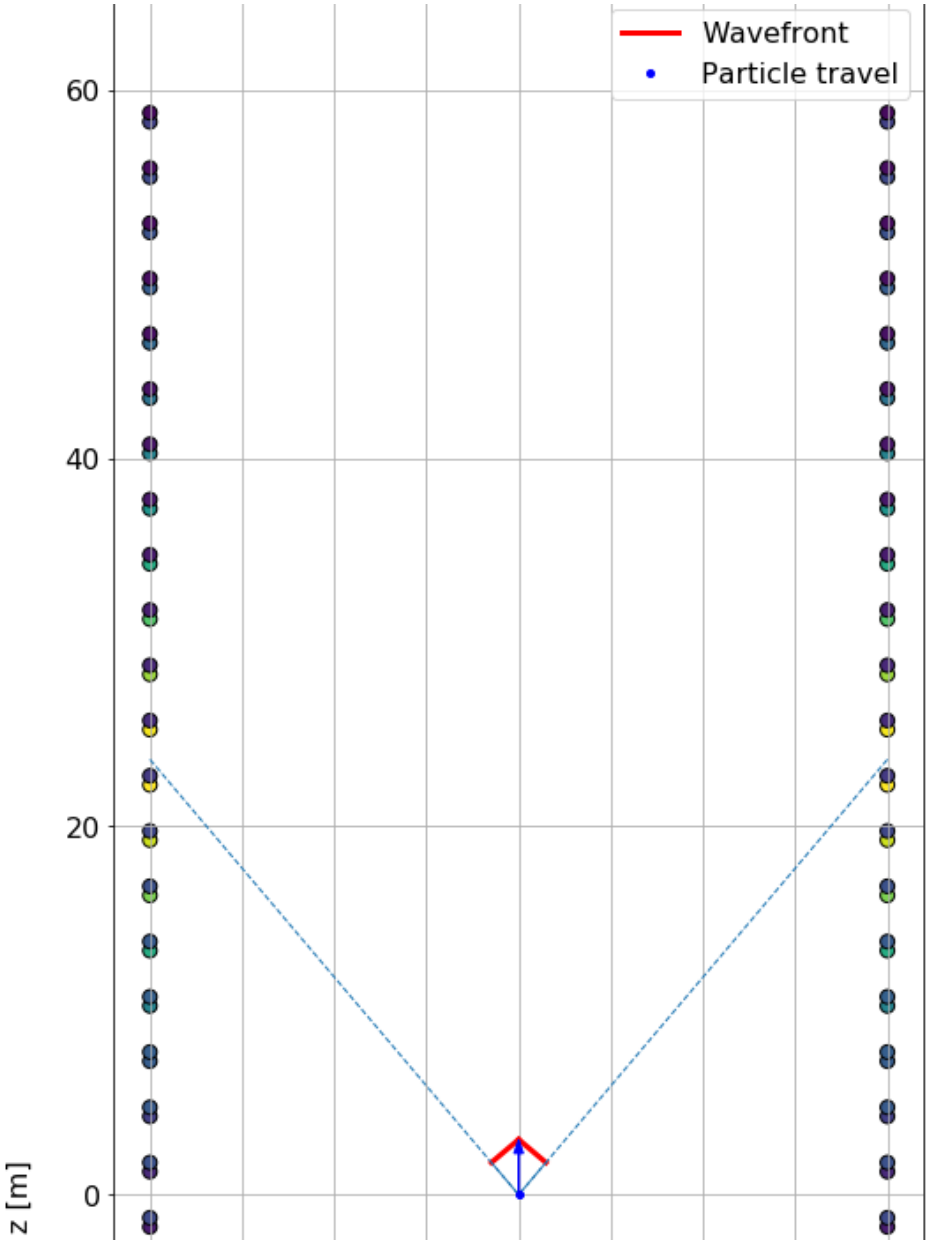
- I made a new detector with 10 modules above the event on each string and 3 below
- I did many reco runs until I looked at the plot on the right
- In this plot, the cherenkov cone only just hits the top module.
- What if the electron was traveling downwards?
- Solution: MAKE IT BIGGER



Cherenkov Cone investigation [3/3]

- Finally the detector was larger enough – 40 modules on each string
- 20 modules below event and 20 above
- The PMTs receiving the most light are the one that are exactly hit by the lower part of the cone





Small update on MC sim with no noise in the "real" upgrade detector