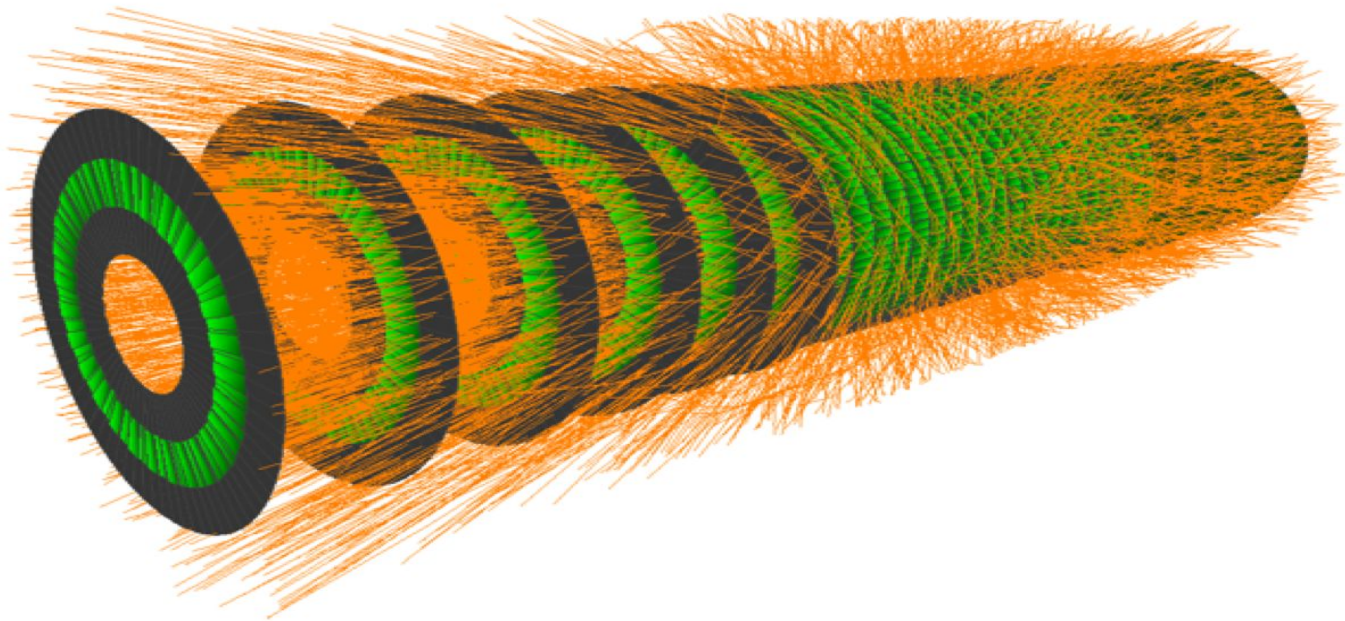


# Implementation and Optimisation in ACTS of algorithms exposed in TrackML

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# The data - TrackML Challenge





# The competitions

- First phase held on Kaggle. Score to optimise = accuracy of reconstruction
- Second phase held on Codalab. Score to optimise = accuracy + time
- Highest score ~95% in time of 0.5 seconds!
- GSoC - Port top 3 algorithms into ACTS and try to build a better algorithm which is a combination of the top solution.



# About the 3 algorithms ported

- The top solution still uses little to no supervised learning
- The other two solutions use Machine Learning.
- A common approach of predicting pairs, then triplets followed by prediction of tracks.



# Other Tasks explored

- Integrating pytorch front-end.
- Optimising the best solution with an Evolutionary Learning Algorithm?



# Key Takeaways

- ACTS is a highly optimised framework utilising much of the modern developments in C++
- Still very few solutions exploiting complex detector geometry and other features which have not been exposed properly.
- For example, the top solution from the 2nd phase. It really works on **ONLY** searching for particles. So the only parameters defined are search window boundaries.



Thank you!