CERN research internship

Post Trip Report (PHYS309)

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The activity I undertook involved the analysis of collision events within heavy ion experiments conducted at the ATLAS detector, CERN. The analysis was performed within ROOT, a coding language specific to CERN, and the characteristics of the jets produced in the collision were studied to try and deduce properties of the quark-gluon plasma produced in the collision. The quark-gluon plasma is an important state of matter because it is one of the earliest states of the universe, before quarks and gluons came together to make hadrons such as protons and neutrons. Much of the time was spent using code to perform cuts on the supplied data and produce histograms to show the distribution of the different variables. Using cuts on the data, it was possible to understand how the particles showers (jets) interact with the quark-gluon plasma and hence deduce properties of the quark-gluon plasma.

The host organisation was LIP in Portugal.

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- The supervisor for my project was Helena Santos.
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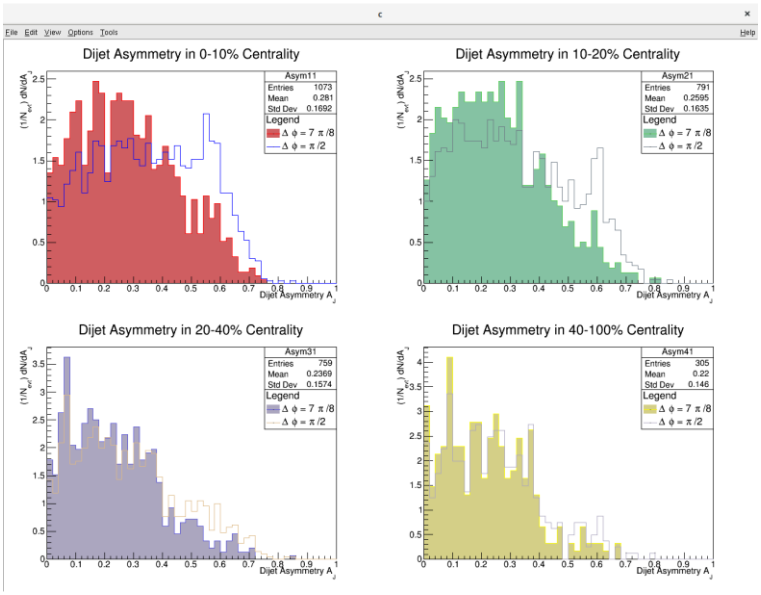
Taking part in this opportunity has significantly increased my confidence in tackling unknown physics problems and communicating scientific ideas to peers. Heavy ion physics was a new subject and I went with no previous experience in this area of research. As a result, my ability to research and apply my knowledge to solve tasks has developed and I have already been able to apply these new skills to work I've undertaken since arriving back in Liverpool. My coding ability was always something I struggled with before leaving, but since completing the project, I am more comfortable in my ability and I also use my intuition more when working with new languages. The opportunity also afforded me new connections in professional settings from different fields, which is allowing me to continually develop my understanding and application of heavy ion and particle physics.



Example histograms produced as part of the analysis. They demonstrate the majority of jets produced in the collisions are dijet events (produced back to back).