



BIG DATA: LHCb

Project flow map

Welcome to Big Data: LHCb! As part of one the Oxford Summer School projects, Big Data: LHCb offers training and an opportunity for students to apply to a research project of their choice. It gives students multiple routes, depending upon their interests and experience. This workshop will teach you about particle physics analysis, how we can use the collected data from the LHCb experiment and perform some measurements that are very interesting for us as particle physicists!

If you have zero experience with programming and particle physics, **there is no need to be worried!** By following these codes you will gain the initial experience required and learn some of the fundamentals tools that you will need to use as an experimental particle physicist such as python, histograms and root files. We will build **together** the necessary knowledge by going through introductory notebooks some particle physics examples and, at the end, you will be able to develop yourself a code to analyse real LHCb data!

Look at the flowchart on the next page!

The **green boxes** show the training notebooks (Books 1 to 7) – these books must be completed in the order shown, but students do not have to finish them all. The books become more challenging as Python skills are progressively developed and applied to analysing and interpreting data.

The **blue boxes** show opportunities to (a) complete the optional exercises to help consolidate student learning before moving on to the next book, or (b) to leave the training books and use the exercise/s as a student research project.

All students start at Book 1, which provides some background to Big Data: LHCb. However, from Book 2 onwards it is up to the student how far they go before switching to their research project. For example, it would be acceptable to gain some Python training in Book 2 before switching to the optional Book 2.5 and use one or more of the exercises as their research project. Alternatively, the student could dip into to Book 2.5 to gain some consolidation, before proceeding to Book 3 and beyond.

Note that other than Book 2.5, all optional exercises/research opportunities are at the end of each book (for Books 3 to 7). You can choose to ignore these optional exercises, use them for consolidation or select an exercise for your research project.

At the end, we will be running a small conference. We hope that you will be able to attend and show what you have achieved in Big DATA: LHCb! To take part, you'll need to create a PowerPoint talk or an academic poster. Don't worry, we will leave enough time for you to prepare your poster!

Happy coding!

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