Searching for Quirks in pp collision data with the ATLAS experiment

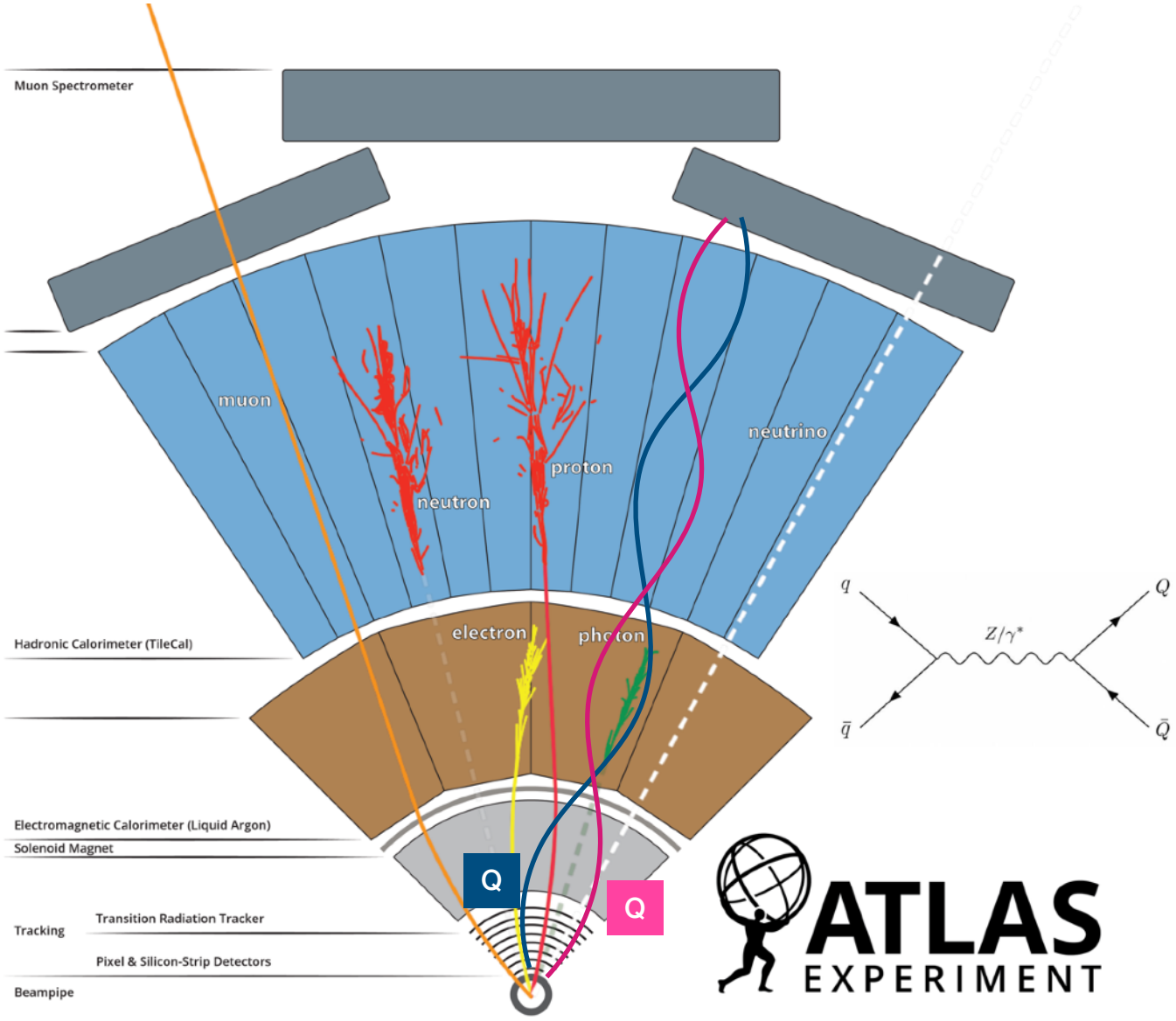


Figure: a visualisation of how a pair of quirks QQ would manifest in the ATLAS detector, and a production Feynman Diagram.

Quirks (not quarks!) are hypothetical particles charged under the SM electric charge as well as a new "infracolour" gauge group. If the mass of the quarks is above the infra colour confinement scale, the quarks can be produced in pairs, but cannot hadronise, and instead **oscillate around their center of mass**, forming an unconventional signature to which ATLAS would be blind without a dedicated analysis.

Until recently, no searches for this model existed at all at the LHC: nut this summer, the FASER collaboration managed to simulate the interactions of these particles with their detector, and produced a first result.

Now, we would like to use their simulation development in the ATLAS detector to produce the first ATLAS search for such a model. This internship will involve lots of R&D, exploring trigger strategies, basic event selections, and designing a new analysis from scratch, possibly using special low-pileup datasets.

Supervisors: Louie Corpe, Marion Missio
Contact: lcorpe@cern.ch, marion.missio@cern.ch

DEADLINE for applications: 30 November 2026
Applications received after this date will not be considered.