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The fragmentation trigger of the FOOT experiment

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The FOOT experiment aims at measuring the nuclear fragmentation of carbon and oxygen nuclei to characterise the secondary products in hadron therapy. C and O beams of an energy in the range 200-400 MeV/u are shot on thin targets, the emerging fragments are reconstructed by the FOOT detector.

Since the projectile fragmentation occurs in less than 10% of the events a sophisticated trigger logic has been implemented to enrich the data sample with fragments which are distinguished from primaries by looking at the energy deposit in the scintillator detectors. The trigger was commissioned in 2021 and used in two data taking campaigns at GSI and CNAO; as a result the collected sample shows 6 times more fragment with respect to the previous set up. The efficiency was also measured to be close to 100% for all fragments.

The trigger algorithm, its implementation in the FPGA-based logic into the WaveDAQ system and the experimental results will be presented.

Collaboration

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