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## A nuclei identification and production programme at LHCb

Leveraging on the excellent performance of the LHCb spectrometer and on the flexibility of its online reconstruction, new methods for the identification of deuteron and helium nuclei have been developed at LHCb. These innovative methods, based on LHCb time of flight capabilities and on energy loss discrimination in the LHCb detectors, open a new window of possible measurements at LHCb. A nearly background-free sample of more than  $10^5$  helium candidates is identified and used to reconstruct (anti)hypertriton production, while (anti)helium from (anti)Lambda-b decays are also studied. In fixed-target beam-gas collisions, deuterons at low momentum are identified with high precision. In both cases, a rich programme of QCD and astrophysics interest, exemplifying LHCb flexibility in exploring new research fields, is foreseen.

### Category

Experiment

### Collaboration (if applicable)

LHCb

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