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Search for the $B^0(s)$ to 4-proton decay in the LHCb experiment

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18+2'

The large masses of **B mesons** allow them to decay into **baryonic final states**. The first observations and studies of such baryonic B decays were performed by the ARGUS and CLEO experiments in the 1990s.

The **LHCb collaboration** has measured the branching fractions of the decays B^0 and $B_s^0 \rightarrow p\bar{p}p\bar{p}$ to be of the order of 10^{-8} using Run 1+2 datasets corresponding to an integrated luminosity of 9 fb^{-1} , with significances of 9.3σ and 4.0σ , respectively. In the charm sector, the BESII collaboration observed the kinematically allowed decay $D_s^+ \rightarrow p\bar{n}$ and has searched for the decay $D_s^+ \rightarrow p\bar{p}e^+$.

Baryonic B decays provide a unique opportunity to study several interesting phenomena, such as: Threshold enhancement - an effect observed in three- and four-body decay modes as an enhancement near the baryon-antibaryon invariant mass threshold; multiplicity effects - the observed hierarchy between the branching fractions of two-body and multi-body final states.

In this talk, I will summarise the Run 2 LHCb analysis of the decays B^0 and $B_s^0 \rightarrow p\bar{p}p\bar{p}$, and share some perspectives to Run 3.

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