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Antineutron reconstruction and identification in electromagnetic calorimeter

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Antineutron studies are an unexplored domain of high energy physics. Several directions of research can be outlined, such as: measuring of hadrons decaying into antineutrons, measuring the interaction of antineutrons with hadrons, and searching for bound states of antineutrons. We present a method for measuring antineutrons by the electromagnetic calorimeter PHOS of the ALICE experiment. The antineutron can be identified by the cluster shape and the energy deposition in the calorimeter, and its momentum can be reconstructed using time-of-flight information. The proposed method was verified via searching for decays $\bar{\Sigma}^{+} \rightarrow \bar{n}\pi^{+}$and $\bar{\Sigma}^{-} \rightarrow \bar{n}\pi^{-}$with an antineutron reconstructed in PHOS.

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