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Searches for Neutron-Antineutron Oscillation in DUNE

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Babu et al. have recently proposed a model of post-sphaleron baryogenesis following the electroweak phase transition. Their theory naturally gives rise to a plausible baryon abundance and a $\Delta B=2$ six-quark operator which allows for the generation of $n\bar{n}$ from n .

Using n bound in Ar, DUNE currently plans to include $n\bar{n}$ events in their nucleon decay searches. Using GENIE, modeling is underway on intranuclear interactions mimicking $n\bar{n}$ annihilation in Ar nuclei. Eliminating atmospheric ν background from such events will be a challenge for liquid Ar TPCs at DUNE, so simulation work must be considered for ν interactions in Ar nuclei, which produce similar signals to $n\bar{n}$ annihilation. Key to understanding possible experimental signals will be the integration of these two for a proper robust analysis, which will determine the viability of any detection of this process above background levels.

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