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Status of cosmic ray antideuteron searches

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The precise measurement of cosmic ray antiparticles serves as important means for identifying the nature of dark matter. Recent years showed that identifying the nature of dark matter with cosmic ray positrons and higher energy antiprotons is difficult, and has led to a significantly increased interest in cosmic ray antideuteron searches. Antideuterons may also be generated in dark matter annihilations or decays, offering a potential breakthrough in unexplored phase space for dark matter. Low-energy antideuterons are an important approach because the flux from dark matter interactions exceeds the background flux by more than two orders of magnitude in the low-energy range for a wide variety of models without relying on any boosting mechanisms, e.g., due to DM clumpiness, Sommerfeld enhancement, or large galactic halo size. This talk is based on a community effort from 2014 that brought together theorists and experimentalists in the field to discuss the current status, perspectives, and challenges for cosmic ray antideuteron searches. It will review the motivation for antideuteron searches, discuss the theoretical and experimental uncertainties of antideuteron production and propagation in our Galaxy, as well as give an experimental cosmic ray antideuteron search status update.

Collaboration

– not specified –

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