

p-wave annihilating dark matter and the EDGES 21-cm signal

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I will demonstrate how current and future measurements of the global 21-cm signal could provide new constraints on models of p-wave annihilating dark matter (DM), over a broad range of DM masses. 21-cm observations are sensitive to the baryon temperature at the end of the cosmic dark ages, and are particularly well-suited to constrain p-wave models, because the energy injection rate from p-wave annihilation increases dramatically around this time due to the formation of large gravitationally bound structures. In addition to the standard cold DM structure formation scenario, we analyze the scenario in which a component of DM obtains a nonzero temperature through its interactions with visible matter. This analysis enables us to set constraints on milli-charged scalar DM, which has been proposed as a possible explanation for the claimed 21-cm signal from the EDGES experiment, and more generally to explore the possible relationship between p-wave annihilating DM and the deep EDGES absorption trough.

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