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Effects of PQ symmetry breaking on the production of QCD axion dark mattter through trapped misalignment

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Does a QCD axion have room for enough Peccei-Quinn symmetry violation to impact the misalignment mechanism? Constraints from the neutron electric dipole moment tell us that the QCD axion must very nearly conserve PQ symmetry, but we also know that the symmetry is not perfect. Even a small amount of PQ breaking can have interesting phenomenology. We show how temperature-dependent PQ breaking can boost axion dark matter production through trapped misalignment. I will show what it takes for this mechanism to motivate dark matter for QCD axion masses much larger than usually expected, all the way up to the astrophysical limits.

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