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Axion Detection Experiments Meet the Majoron

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The majoron is a well-motivated light (pseudo-Nambu-Goldstone) boson associated with the spontaneous breaking of a global lepton-number symmetry. In this letter, we relate the spontaneous breaking scale and its soft-breaking mass by requiring that the majoron is the main component of the dark matter. An electromagnetic-anomalous coupling can be induced by minimally modifying the original majoron model, surprisingly, predicting a parameter region that largely overlaps with the QCD-axion dark matter band. Thus, we expect that axion search experiments meet the majoron.

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