

HyperLSW: An ultimate experiment to determine the amount of dark matter axions

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After discovering dark matter (DM) axions in a haloscope, follow-up experiments will be required to break the degeneracy between the axion coupling to photons and its local DM abundance. Since a discovery would justify more significant investments, I assess the ability of ambitious light-shining-through-a-wall (LSW) experimental designs to target the QCD axion band. The measurement of the axion mass through the haloscope discovery would allow one to choose a suitable magnetic field configuration to reach sensitivity at masses in the QCD axion band. I show that a wide range of well-motivated QCD axion models is accessible to such experiments, making it possible to determine whether axions are the dominant DM in the Universe. Since this represents the first concrete realization of a post-discovery experimental program, I comment on its challenges, as well as complementary experiments and future directions beyond LSW experiments.

Title of the Poster/Talk

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Primary authors: LUCENTE, Giuseppe (Institute for Theoretical Physics, University of Heidelberg); JAECKEL, Joerg (IPPP Durham University); HOOF, Sebastian (Università degli Studi di Padova)

Presenter: LUCENTE, Giuseppe (Institute for Theoretical Physics, University of Heidelberg)

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