

# Bethe Colloquium

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## Rethinking Axion Dark Matter

When the Peccei-Quinn symmetry breaks after inflation, domain walls will form at the QCD scale in the axion field if there is more than one quark charged under the symmetry (as in e.g. the DFSZ model). When destabilised by quantum gravity effects, the collapse of the wall network creates relativistic axions, which subsequently turn non-relativistic and contribute to cold dark matter. Accounting for this requires the axion to be heavier than  $\sim 10$  meV — a mass range that is little explored experimentally. We describe first results from a light-shining-through-walls search at the EuXFEL, Hamburg.

[Halliday et al. Phys.Rev.Lett. 134:055001(2025); Beyer & Sarkar, SciPost Phys.15:003(2023)].

**BCTP, Room W 2.019 - Wegelerstr. 10 - 53115 Bonn**  
**Thursday, October 2, 2025 at 2:15 p.m.**

**Exceptional Time!**

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