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Searching for galactic axions through magnetized media: The QUAX proposal

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We present a proposal to search for QCD axions with mass in the 200 μeV range, assuming that they make a dominant component of dark matter. Due to the axion–electron spin coupling, their effect is equivalent to the application of an oscillating rf field with frequency and amplitude fixed by the axion mass and coupling respectively. This equivalent magnetic field would produce spin flips in a magnetic sample placed inside a static magnetic field, which determines the resonant interaction at the Larmor frequency. Spin flips would subsequently emit radio frequency photons that can be detected by a suitable quantum counter in an ultra-cryogenic environment. This new detection technique is crucial to keep under control the thermal photon background which would otherwise produce a too large noise. (On the behalf of the QUAX collaboration)

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