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Discovering the QCD Axion with Polarization Haloscopes

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The QCD axion is a well-motivated extension of the Standard Model which dynamically relaxes away strong CP violation. However, to date most searches for the axion have instead focused on its model-dependent coupling to photons. I will present a new idea for axion detection that directly targets its defining coupling to gluons, by resonantly amplifying the oscillating currents from time-varying atomic electric dipole moments. If these effects are enhanced by large nuclear Schiff moments, such as in octupole-deformed nuclei, our proposal could be sensitive to the QCD axion's defining coupling at the most motivated GHz frequencies.

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