

T-RAX: Transversely Resonant Axion eXperiment

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We propose to use an elongated rectangular waveguide near its cutoff frequency for axionic dark matter searches. The detector's large surface area allows for significant signal power, while its narrow transverse dimension and tapered-waveguide coupling suppress parasitic modes. The proposed system can fit inside a solenoid magnet and is sensitive to the QCD-axion in the axion mass $40 - 400 \mu\text{eV}$. We describe the theoretical principles of the new design, present simulation results, and discuss the implementation. We conclude by discussing the application of a single-photon counter.

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