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Intertwining Axion and gravitational waves, generations and detection.

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Firstly, we briefly discuss how the hypothetical beyond-the-Standard-Model particle, the axion, can produce gravitational waves through several mechanisms. Then we present some of our recent proposals for detecting axions/gravitational waves, including cryogenic quantum transport technology, traditional spin systems, and specially engineered artificial magnetoelectric materials. We demonstrate that room-sized detectors have promising sensitivity to axions with masses from kHz to GHz, and that a similar device can also be used for high-frequency gravitational wave detection over the same frequency range.

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