

TOPICAL REVIEW

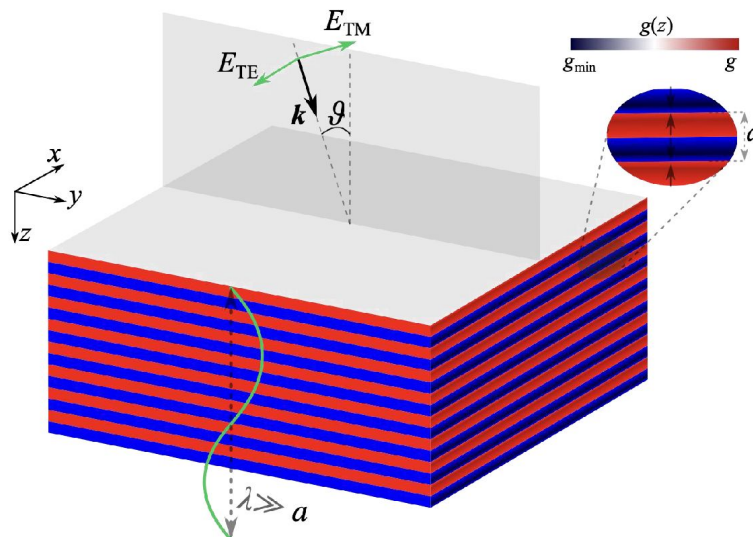
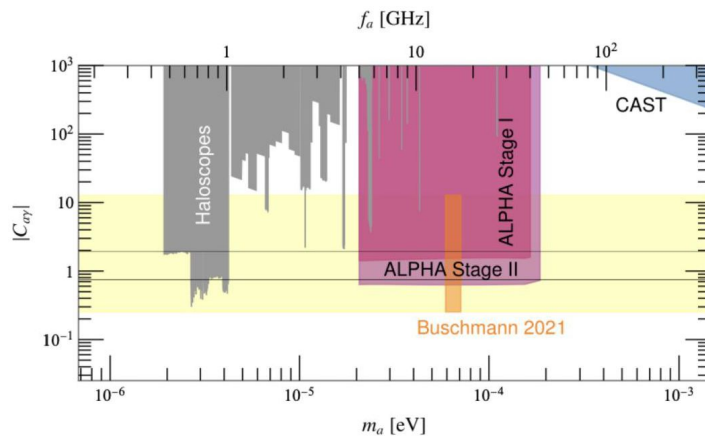
## Axions From $\beta$ to $\delta$

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**Abstract** Axions are hypothetical particles that were originally proposed in order to explain a key feature of fundamental physics – the remarkable accuracy of time-reversal symmetry – that the standard model, as presently understood, leaves mysterious. Later, we realized that axions also have the right properties to supply the “dark matter” needed in cosmology. Here, after very briefly reviewing the plasma haloscope idea (pursued by the ALPHA collaboration) that is brightening prospects for axion detection, I sketch three other recent developments in axion physics: the possible utility of photonic crystals for axion detection, the experimental study of emergent axions—that is, degrees of freedom whose interaction with electromagnetism is axion-like – in materials, and the design of emergent axions in metamaterials.

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## References

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