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Electromagnetic fields induced by an electric charge near a Weyl semimetal

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Weyl semimetals (WSMs) are a new class of topological materials that exhibit a bulk Hall effect and a chiral magnetic effect. The topological contribution of these unusual electromagnetic responses can be characterized by an axion term $\theta\mathbf{E}\cdot\mathbf{B}$ with space and time dependent axion angle $\theta(r,t)$. In this presentation I will show the electromagnetic fields produced by an electric charge near a topological WSM in the equilibrium state, at zero electric chemical potential, and with broken time-reversal symmetry. As in ordinary metals and dielectrics, outside the WSM the **E** field is mainly determined by the optical properties of the material. On the contrary, the **B** field is of topological origin due to the magnetoelectric effect of topological phases, a distinctive behaviour that is an experimentally observable signature of the anomalous Hall effect in the bulk of the WSM. Two experimental setups for testing our predictions of the induced magnetic field will be discussed.

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