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Chiral effects and physics of chiral media

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We consider chiral liquids,consisting of massless fermions and right-left asymmetric.In such media, one expects existence of new transports in equilibrium. Among them electric current flowing along external magnetic field which is predicted to be dissipation free. We argue that actually the chiral liquids in the hydrodynamic approximation should satisfy further constraints, like infinite classical conductivity.

Summary

We have shown that conservation of the axial charge implies that classically chiral media are perfect liquids, with no dissipation. It was demonstrated recently that the chiral anomaly modifies hydrodynamics of chiral media on the classical level. What we are adding to this observation, is that for the consistency of the hydrodynamic approximation, the novel pieces in the axial charge should conserve on the classical level as well.

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