

# Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



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## Chirality transfer & chiral turbulence in gauge theories

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Sharing and transfer of chirality between gauge fields and fermion plays a crucial role for understanding the dynamics of anomalous transport phenomena such as the Chiral Magnetic Effect. We present a first principles study of the chirality transfer between gauge fields and fermions based on classical-statistical real-time lattice simulations. We demonstrate that a chirality imbalance in the fermion sector triggers plasma instabilities in the gauge field sector, which ultimately lead to the emergence of turbulent behavior characterized by a self-similar infrared cascade of magnetic helicity. We comment on the differences between abelian and non-abelian gauge theories, and discuss consequences for modeling anomalous transport phenomena in heavy-ion collisions

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