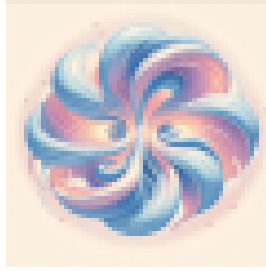


# The 8th International Conference on Chirality, Vorticity and Magnetic Field in Quantum Matter



ID de Contribution: 85

Type: **Flash Talk (Plenary) + Poster**

## Helicity relaxation time in an interacting fermionic plasma

*lundi 22 juillet 2024 18:00 (5 minutes)*

The polarization of free Dirac fermions can be described by helicity, which represents the projection of the spin along the direction of motion. The helicity operator commutes with the Hamiltonian and therefore helicity is a good<sup>o</sup> quantum number, even in the case of massive fermions. This opens the possibility of defining a helicity current<sup>o</sup>,  $J^\mu_H$ , which is conserved for free fermions. In the case of massless fermions,  $J^\mu_H$  transforms covariantly under Lorentz transformations. Integrating its zeroth component over the spatial volume gives the helicity charge,  $Q_H$ .

Consider now an ensemble of interacting fermions with a slight helicity imbalance. Due to the helicity-violating pair annihilation (HVPA) processes, the helical imbalance will dissipate in time. This poster addresses the calculation of the typical timescale of the helicity relaxation time in the high-temperature, deconfined phase of the quark-gluon plasma, by employing the Boltzmann collision integral for the HVPA processes.

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