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Hall transport and Berry gauge fields in quantum materials

I will discuss Hall effects from the standpoint of the quantum kinetic equation. Emphasis is placed on an egalitarian treatment of all aspects of the semi-classical approximation, so that emergent gauge fields and Berry curvatures are given equal treatment to the emergence of a semi-classical distribution. The approach allows simultaneous consideration of scattering and adiabatic mechanisms, and I will describe ongoing applications of other types.