

Texas Tech University. Pure Mathematics Colloquium.  
Current Advances in Mathematics.

# The Berry phase and the phase of the determinant

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**ABSTRACT.** In 1984 Michael Berry discovered that an isolated eigenstate of an adiabatically changing periodic Hamiltonian acquires a phase, called the Berry phase. Barry Simon gave an interpretation of this phase in terms of the holonomy of a certain Hermitian line bundle. There are several situations described in physical literature when the Berry phase is claimed to be equal to the phase of the determinant of the corresponding imaginary-time Schrödinger operator. However not only rigorous proofs but even the accurate formulations of these results are missing in the literature. In this talk we establish and prove the precise relationship between the phase of this determinant and the Berry phase under the most general assumption on the Hamiltonian. The previously known examples are the special cases of this formula.