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Diabolic Topology , Berry Phase and Optical Phase Shifts of Light in Mobius-Type Strips RADHA BALAKRISHNAN, The Insitute of Mathematical Sciences, India, INDUBALA SATIJA, George Mason University — We compute the optical phase shifts between the left and the right-circularly polarized light after it traverses non-planar cyclic loops describing the boundary curves of twisted strips. These optical results expressed in quantum-mechanical language in fact illustrate the phenomenon of Berry phase. Equation for the evolution of the fields described by Fermi-Walker formulation is mapped to Schroedinger equation with Hamiltonian whose eigenvalues are equal to the $\pm kappa$ where κ is the curvature of the path. The inflexion points underlying the twisted strips manifest as the diabolic crossings of the quantum Hamiltonian. For the Mobius loops, the critical width where the diabolic geometry resides also correspond to the characteristic width where the optical phase shift is minimal.

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