Berry-like phases in structured atoms and molecules[1] EDMUND
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JOHN BOHN, JILA — Quantum mechanical phases arising from a periodically vary-
ing Hamiltonian are considered. These phases are derived from the eigenvalues of
a stationary, "dressed" Hamiltonian that is able to treat internal atomic or molec-
ular structure in addition to the time variation. In the limit of an adiabatic time
variation, the usual Berry phase is recovered. For more rapid variation, nonadia-
batic corrections to the Berry phase are recovered in perturbation theory, and their
explicit dependence on internal structure emerges. Simple demonstrations of this
formalism are given, to particles containing interacting spins, and to molecules in
electric fields.

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