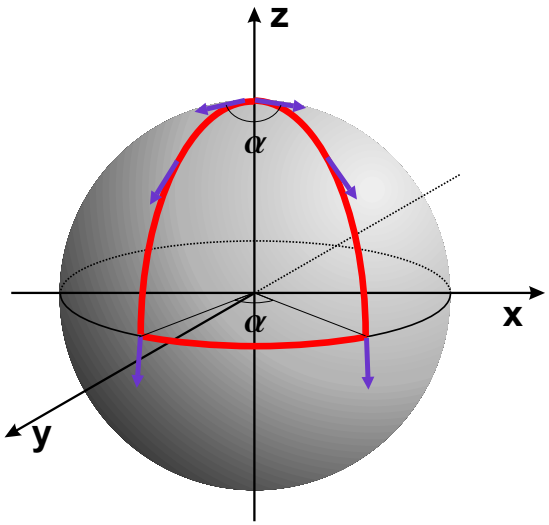
Geometric Phase in Neutron Interferometry

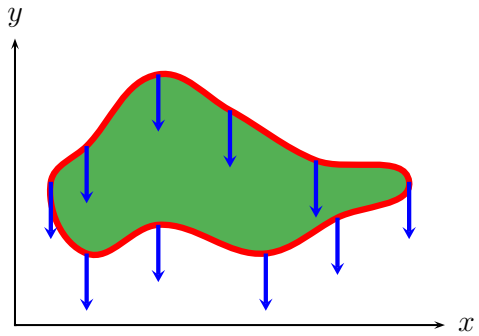
Stefan Filipp,
Y. Hasegawa, R. Loidl, J. Klepp, C. Plonka

S18 - Atominstitut, Wien, Austria
Institut NPP - Laue-Langevin, Grenoble, France

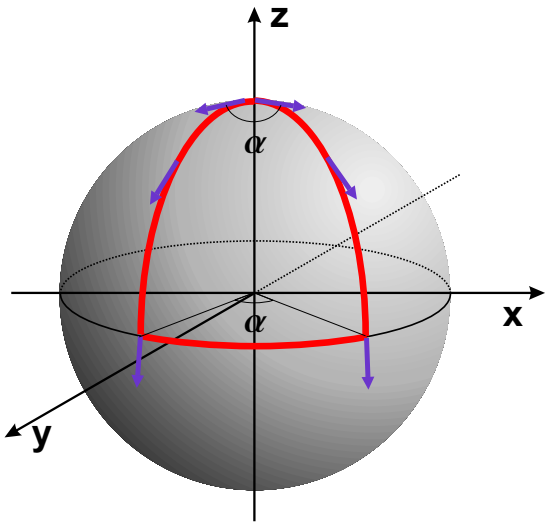
Supervisor: H. Rauch

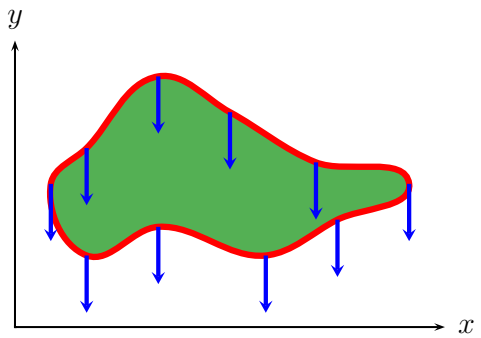
Classical geometric effects



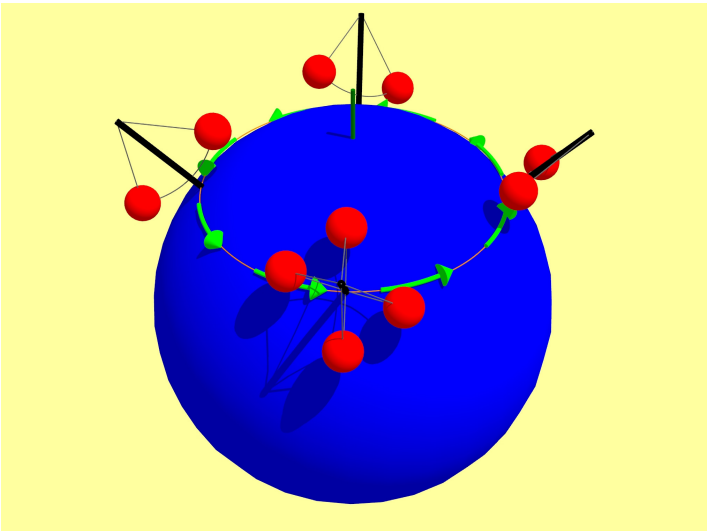


Classical geometric effects





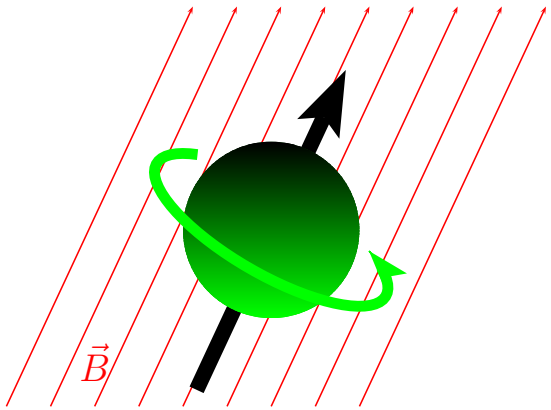
Foucault's pendulum:

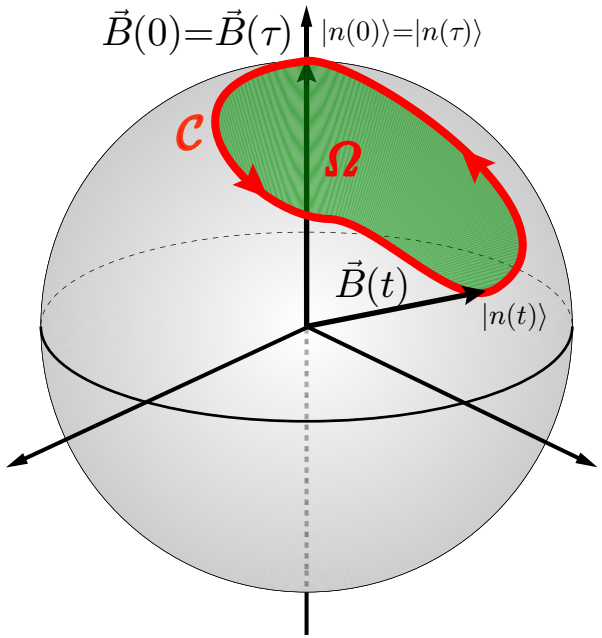


Geometric Phase

Adiabatic, Cyclic Evolution - *Berry phase*

[Proc. R. S. Lond. A 392, 45 (1984)]

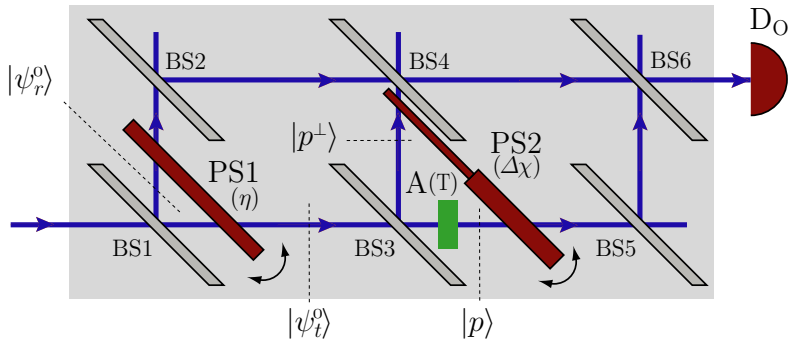


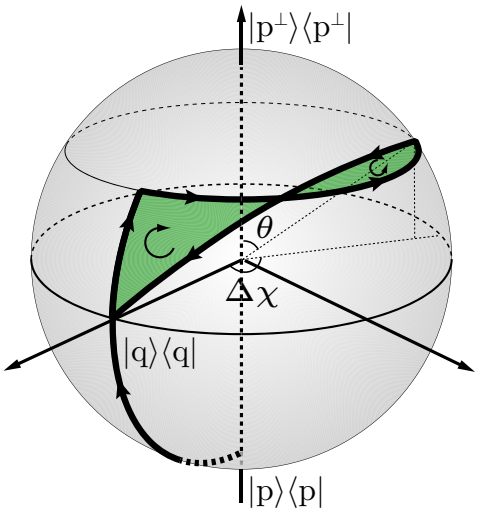


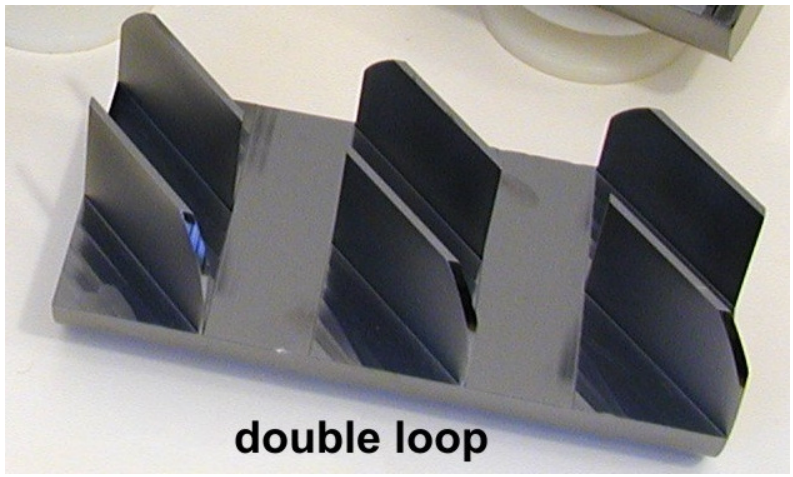
$$|n(\tau)\rangle = e^{-\frac{i}{\hbar}\int_0^\tau dt E_n(t)} e^{i\phi_g} |n(0)\rangle, \qquad \boxed{\phi_g = -\frac{\Omega}{2}}$$

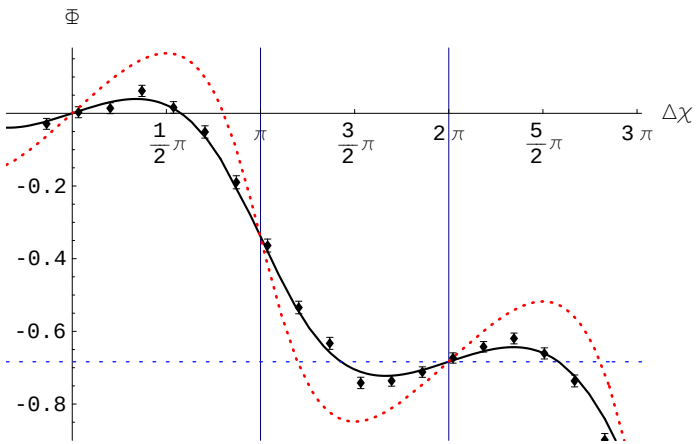
Spatial geometric phase

S. Filipp, Y. Hasegawa, R. Loidl, and H. Rauch. PRA 72 021602(R) (2005)









Future Perspectives: Stability of Berry Phase

DeChiara and Palma[PRL 91, 090404 (2003)]