Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Monodromy? What's Monodromy?[1] J.B. DELOS, William and Mary, D. SADOVSKII, B. ZHILINSKII, Universite Littoral — We say that a system exhibits *monodromy* if we take the system around a closed loop in its parameter space, and we find that the system does not come back to its original state. Many systems have this property: atoms in a trap, a hydrogen atom in crossed fields, electronic states of H_2^+, and vibrational states of CO_2. Imagine noninteracting classical particles moving in a two-dimensional circular box with a hard reflecting wall, and with a cylindrically-symmetric potential energy barrier: $\rho = (x^2+y^2)^{1/2}$, [$V(\rho)$ = -a $\rho^2/2$, ρ <R], [$V(\rho)$=infinity, $\rho \geq$R]. Start all the particles moving on one line with angular momentum L=0, and with energy E<0. Then impose additional smooth forces and torques on the particles so that [L(t), E(t)] moves in a circle around the origin in the [L,E] plane. In other words, apply a torque to increase the angular momentum, then drive the particles to a higher energy (above the barrier), then reduce the angular momentum to a negative value, reduce the energy, and finally come back to the initial energy and angular momentum. Where in space do the particles end up? The answer is surprising.

[1]Supported by NSF

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Date submitted: 27 Jan 2006 Electronic form version 1.4