Hamiltonian Monodromy: Unexpected behavior of quasi-linear molecules, atoms in traps and of hydrogen in crossed fields J.B. DELOS, William and Mary, C. SCHLEIF, UC Merced, D. SADOVSKII, G. DHONT, B. ZHILINSKII, U. du Littoral — 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, including quasi-linear molecules, atoms in a trap or a hydrogen atom in crossed fields. Using classical perturbation theory, Sadovskii and Cushman predicted the presence of monodromy in perpendicular fields. It shows up as a defect in the lattice of quantum states. When the fields are tilted from perpendicular, these lattice defects undergo a series of bifurcations. Atoms in a trap can display a newly discovered dynamical manifestation of monodromy. This phenomenon will also occur with oriented dipolar molecules in fields or with quasilinear molecules. (Supported by NSF and Region Nord–Pas-de-Calais)

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