SEMINAR

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Atoms in quadrupole traps: some puzzling results from recent experiments

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Abstract

Recent experiments in the group of C. Salomon (ENS-Paris) have shown some interesting behaviour for a classical gas of almost _non-interacting_ atoms trapped in a quadrupole potential, namely that when give a momentum kick to a 3D gas with very weak collision rate, it seems not to react along transverse directions, even though the quadrupole potential is not separable. Indeed the trajectories of individual atoms are highly complex but the gas as a whole seems to preserve a memory of the direction of the kick for very long (perhaps infinite) time. I will discuss the origin of the phenomenon and other issues related to classical irreversibility in the gas kinetics. An additional twist comes from considering a canonical transformation which maps the system onto that of a gas of Weyl fermions. This allows us to make nontrivial statements about the long term dynamics of these exotic particles in harmonic traps.