Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **3361** Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

Caustics, Chaos, and Branched flow in a Kicked Bose-Einstein Condensate

Monday 6 June 2022 14:00 (15 minutes)

We numerically study the quantum dynamics of a bosonic Josephson junction (a Bose-Einstein condensate in a double-well potential) in the context of periodic driving of the tunnel coupling. In particular we examine how caustics, which can dominate the Fock space wavefunction following a sudden quench of the undriven system, are affected as the kicking strength is increased. In the limit of weak tunnelling and low number imbalance, the system maps onto the kicked rotor (an archetype of chaotic dynamics). By varying the strength of the kick quasi-randomly, we are able to realize a regime of "branched flow", a paradigm of wave behaviour in random media relevant to electron flow in conducting materials, radiowave propagation through the interstellar medium, and tsunamis in the ocean.

Author: HAINGE, Joshua

Co-author: O'DELL, Duncan

Presenter: HAINGE, Joshua

Session Classification: M2-5 Degenerate Quantum Gases and Cold Atoms and Molecules (DAMOPC/DCMMP) | Gaz quantiques dégénérés, molécules et atomes froids (DPAMPC/DPMCM)

Track Classification: Technical Sessions / Sessions techniques: Atomic, Molecular and Optical Physics, Canada / Physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)