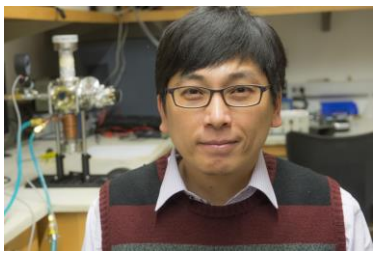
אוניברסיטת בר-אילן
Bar-Ilan University

Faculty of Exact Sciences **הפקולטה למדעים מדויקים**

Department of Physics המחלקה לפיסיקה

You are cordially invited to the Physics Department Colloquium to be given by:

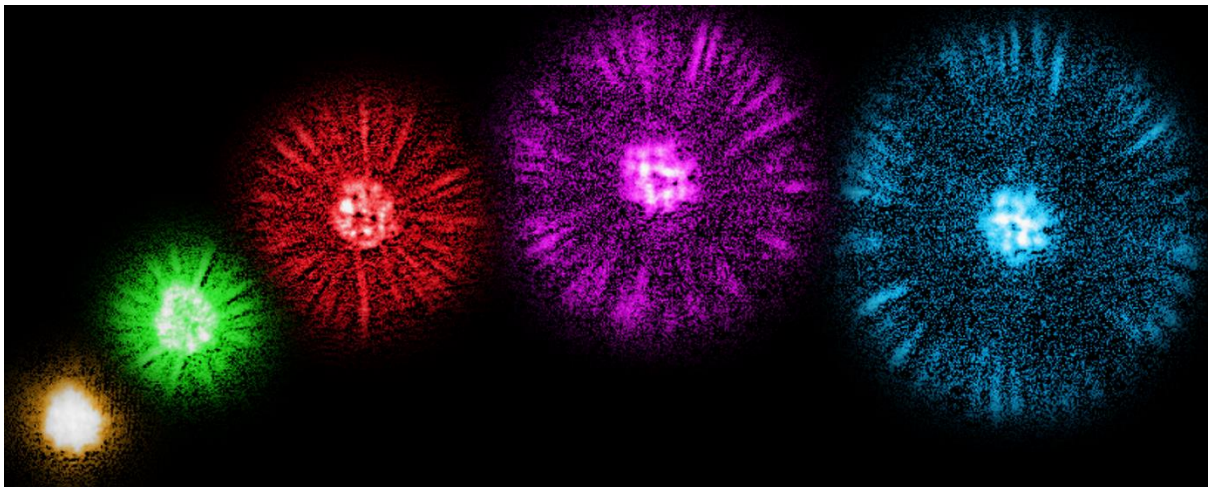


Prof. Cheng Chin

James Franck institute, Enrico Fermi institute,
Department of Physics, University of Chicago, USA

Bose fireworks and Hawking-Unruh radiation

Quantum phenomenon in curved spacetimes is an intriguing research topic that aims to offer hints to the not-yet-known theory of quantum gravity. One famous prediction is the Hawking-Unruh effect, the manifestation of Minkowski vacuum in a reference frame with high acceleration. We simulate the transformation to an accelerating frame by parametrically driving a Bose-Einstein condensate of atoms. Above the critical threshold, the driven condensate suddenly emits many jets of matterwaves in all directions. The emission resembles fireworks and displays a Boltzmann distribution that resembles the Unruh radiation. The measured temperature and entropy are in excellent agreement with Unruh's predictions. We further detect non-local quantum coherence and temporal reversibility of the matterwave emission, which are hallmarks that distinguish Unruh radiations from the classical blackbody radiation. Our results confirm the quantum nature of Unruh effect.



MONDAY, DECEMBER 16, 10:45 (light refreshments at 10:30)

THIS COLLOQUIUM IS A PART OF QUEST *II* WORKSHOP 2019

The lecture will be given at Mina and Everard Goodman Computer Engineering, Building 1102, Auditorium 2 ***NOTE: SPECIAL VENUE***