Physics AT QUEENS COLLEGE

Colloquium Notice

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Intriguing dynamics in a dense cell monolayer

In this talk, we consider an expansion of a dense monolayer of cells: a collective multicellular phenomenon, where cells divide, grow, and maintain contacts with their neighbors. During migration, cells display complex behavior, adjusting both their division rate and their growth after division to the local mechanical environment. Experimental observations show that cells near the edge of the expanding monolayer are larger and move faster than cells deep inside the colony. To explain these observations and describe cell migration patterns, we formulate a spatio-temporal theoretical model for multicellular dynamics in terms of the cell area distribution; the model includes cell growth after division and effective pressure. Numerical simulations of the model predict both the speed of invasion and the width of the outer proliferative rim; these predictions are in a good agreement with experimental observations. Theoretical analysis yields the equation for density of cells and reveals a novel type of propagating front with compact support. The velocity of front propagation (monolayer expansion) is obtained analytically and its dependence on all the relevant parameters is determined.

Monday
October 30, 2023
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326
This talk is accessible via **Zoom** or use
meeting ID 829 2687 2594 and **passcode 866995** to join