University of Victoria

PHYSICS AND ASTRONOMY COLLOQUIUM (Online)

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"Planetesimal Formation in Circumstellar Disks"

Abstract

"Planetesimals are small rocky (and sometimes icy) objects, typically 1-100 km in diameter (e.g., asteroids and comets in the Solar System). One of the largest unanswered questions in planetary astrophysics is: how do these planetesimals form in the disks that orbit young, newly formed stars ("circumstellar disks")? In this talk, I will discuss progress that my group has recently made in answering this important question. In particular, using large-scale fluid and particle dynamics simulations run on national level supercomputers, we have studied an aerodynamic clumping mechanism, known as the streaming instability, as the route toward forming these bodies. In comparing the properties of planetesimals formed via this mechanism with observations of bodies in our own Solar System (i.e., the icy comet-like objects beyond the orbit of Pluto), we have shown that the streaming instability is a very strong candidate for producing these bodies. I will also discuss current and ongoing work to further compare theory and observations, namely within the context of the size distribution of planetesimals, and to understand under what conditions the streaming instability operates. Finally, I will conclude by discussing how our results fit within our current understanding of planet formation."

Wednesday, September 20th, 2023

3:30 p.m. PST

Zoom link available on UVIC Event Calendar