



DEPARTMENT OF PHYSICS
THE UNIVERSITY OF HONG KONG



香港天文與天體物理研究所
THE HONG KONG INSTITUTE FOR
ASTRONOMY AND ASTROPHYSICS

HKIAA SEMINAR SERIES

A Deep Dive into the Fast Radio Burst Escape Problem

S P E A K E R

Mr. Ethan van WOERKOM
UNIVERSITY OF HELSINKI

Ethan van Woerkom is a Doctoral Researcher at the University of Helsinki. His work concentrates on understanding the physics of Fast Radio Bursts: their energy source, emission process and escape. His work combines theoretical and computational methods from plasma physics to understand problems in astrophysics. He graduated with a BSc (Hons) in Mathematical Physics from the University of Edinburgh in 2020. He completed his Master's thesis at the University of Amsterdam on the topic of modelling the long-term (1-100 yrs) radio afterglow of the ejecta-ISM interaction from binary neutron star mergers.

A B S T R A C T

The site and emission mechanism of Fast Radio Bursts (FRBs) is still an open problem. Recent theoretical work indicates that the strong electromagnetic waves of Fast Radio Bursts must be absorbed due to induced stochastic acceleration of particles if they are emitted in the magnetised plasma in the inner magnetosphere of a magnetar.

Paradoxically, observations of Fast Radio Bursts (FRBs) display ultra-short timescales, with bursts as short as 4 microseconds, and intra-burst variability occurring at 1-2 orders of magnitude shorter timescales yet. These timescales are more easily explained by models with emission occurring closer to the central engine. This contradiction is the paradox that underlies FRB emission.

In my talk I will discuss that stochastic acceleration is a robust process, show the conditions under which it can or cannot occur using simulations, and discuss the underlying assumptions in detail.

I will also introduce the work we do at the Helsinki Computational Plasma Astrophysics group and introduce our Runko particle-in-cell code which is used to simulate relativistic plasmas from first-principles.

20 July 2026 (Monday)

10:00 – 11:00 AM

Venue: Room 522, 5/F · Chong Yuet Ming Physics Building

Department of Physics, The University of Hong Kong

Anyone interested is welcome to attend.



ZOOM FOR ONLINE PARTICIPANTS

Meeting ID 964 7297 1072

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hku.zoom.us/j/96472971072

Enquiries: arenal@hku.hk · +852 3917 3416



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