

**THE UNIVERSITY OF HONG KONG**

*DEPARTMENT OF PHYSICS*

*SEMINAR*

# **Fast Radio Bursts Triggered by Magnetar Crust Quakes: Emission and Nonlinear Scattering**

**Dr. Yuanhong QU**

*University of Nevada, Las Vegas; Norppa Fellow, University of Helsinki, Finland*

Abstract:

In this talk, I will present my work on the trigger mechanisms, radiation processes, and propagation effects of fast radio bursts (FRBs). I will begin by discussing generic observational constraints on the intrinsic radiation mechanisms of FRBs and argue that repeating FRBs most likely originate within the magnetar magnetosphere. I will show that magnetar crust quakes, as the trigger mechanism, play a crucial role in exciting various wave modes in the magnetosphere. Specifically, elastic waves are generated by incompressible shear perturbations in the magnetar crust and propagate perpendicular to the surface. These waves couple directly to fast magnetosonic and Alfvén waves in the magnetosphere, both typically in the kilohertz band and excited by crust quakes. I will present the first 3D elasto-dynamic simulations of the entire magnetar crust, demonstrating that both fast magnetosonic and Alfvén waves can be generated with comparable energy contributions. Next, I will show that FRBs are likely produced via coherent inverse Compton scattering (ICS) of low-frequency fast magnetosonic waves by relativistic charged bunches at distances of a few hundred magnetar radii. I will also discuss the ICS model's implications, including the high degrees of linear and circular polarization and the narrow spectra observed in many repeating FRBs. Finally, I will demonstrate that in the open field line region, large-amplitude FRBs can freely escape from the magnetosphere.

**Thursday, April 16, 2026, 4:15pm**

Room 522, 5/F, Chong Yuet Ming Physics Building, The University of Hong Kong

Department of Physics, Chong Yuet Ming Physics Building, The University of Hong Kong

*Phone: 39172360 Fax: 25599152. Anyone interested is welcome to attend.*