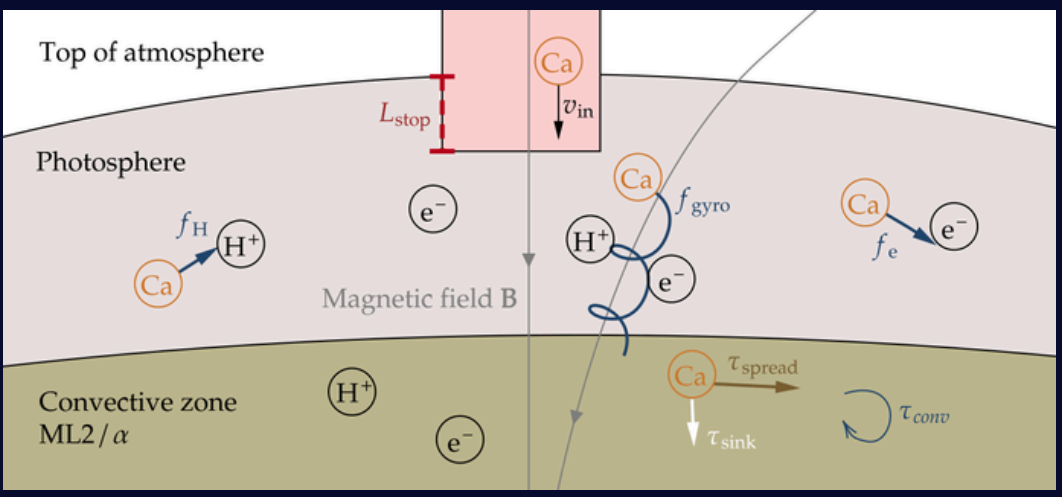
TSI SEMINARS - FALL 2026

White Dwarf Physics Across Ten Orders of Magnitude



Dr. Dang Pham

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Abstract: *White dwarfs (WDs) are powerful astrophysical laboratories, capable of probing physics spanning ten orders of magnitude in spatial scale. In this talk, I will first discuss how wide binaries containing WDs provide a pathway to exploring post-main-sequence natal kicks associated with asymmetric mass loss. Through developing a Fokker-Planck theory for orbital evolution and applying a binary population synthesis model on observed Gaia separation and eccentricity of wide WD binaries, new constraints on the nature of WD kicks are inferred. Next, I will present simulations of sustained exo-Oort cloud pollution over Gyr timescales and discuss the rich, modified loss-cone dynamics involved. Finally, I will present a model of metal accretion around magnetic WDs, explaining how magnetic fields restrict pollution geometry to create the recently observed "spotty" metal patches. These patches imply suppressed convective mixing and can alter inferred accretion rates by several orders of magnitude. By connecting orbital dynamics to microscopic surface accretion, these diverse phenomena highlight how WDs can probe physics across vastly different regimes.*

November 17, 3:30 PM

Bell Room (Rutherford 103)

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