ASTROPHYSICS SEMINAR SERIES

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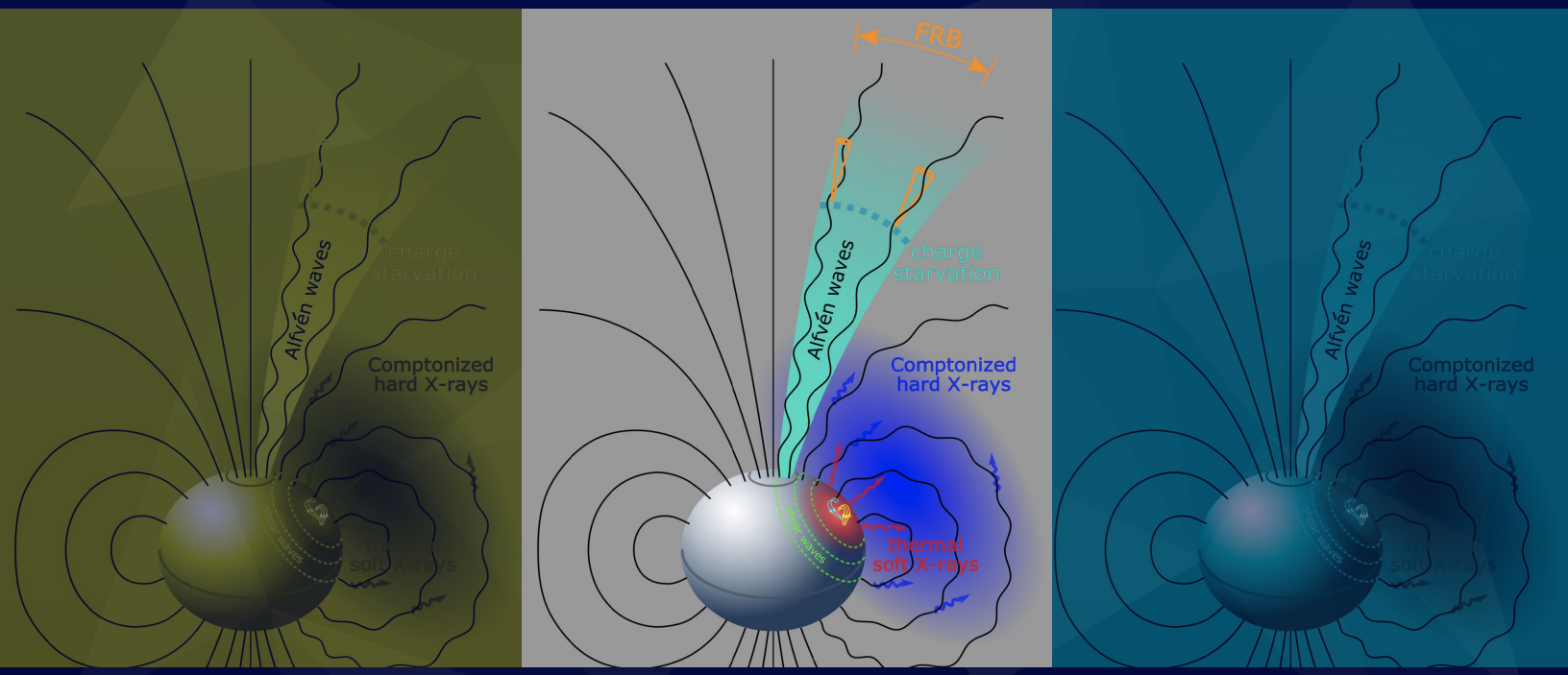

A Unified Picture of Fast Radio Bursts

Wenbin Lu | *Caltech*

Fast radio bursts (FRBs) are short duration (~ms), very bright, radio transients. Their detection a decade ago was a major unexpected discovery in astronomy in decades. Hunting for FRBs and measuring their physical properties have become one of the leading scientific goals in astronomy. This effort has led to a rapidly growing sample with extremely diverse properties in luminosity (10^38 to 10^45 erg/s), duration (0.1 ms to 10 ms), and repetition rate (some objects have multiple bursts in an hour and many just one burst in a few years). I will present a study of their cosmological volumetric rate density and provide evidence that these bursts all belong to the same class of transients --- most likely all are repeaters. According to my model, disturbances close to the surface of a magnetar launch Alfven waves into the magnetosphere, which propagate to a distance of a few tens of neutron star radii and then produce coherent radio emission. The coincident hard X-rays associated with the Galactic FRB 200428 can be understood in this scenario. This model provides a unified picture for weak Galactic FRBs as well as the bright bursts seen at cosmological distances. If time allows, the polarization properties of FRBs will also be addressed.

29 SEP 2020 **3:30 PM EDT** **YouTube LIVE**