

Spring 2020 Colloquium

Department of Physics & Astronomy, TAMU-Commerce

Feb 13, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Astrophysics

Neutron Stars as Cosmic Laboratories

Dr. Vanessa Graber

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Dr. Graber earned a master's degree in Physics from Eberhard Karls University Tübingen (Germany) in 2012, and a Ph.D. degree in Applied Mathematics from the University of Southampton (UK) in 2016. Her Ph.D. research focused on the study of neutron stars, in particular, the connection between astrophysics and condensed matter physics. From 2016 to 2019, Dr. Graber worked as a postdoctoral fellow at the McGill Space Institute in Montreal (Canada). In 2020, she began an appointment as a senior postdoctoral researcher at the Institute for Space Sciences in Barcelona (Spain), where she is currently focusing on the population synthesis of isolated neutron stars in the Milky Way. More information about Dr. Graber

and her research can be found at <https://vanessagraber.github.io/>

Abstract

Neutron stars unite many extremes of physics which cannot be reached on Earth, making them excellent cosmic laboratories for the study of dense matter. One exciting example is the presence of superfluid and superconducting components in mature neutron stars. When developing mathematical models to describe these large-scale quantum condensates, physicists tend to focus on the interface between astrophysics and nuclear physics. Connections with low-temperature physics are often ignored. However, there has been dramatic progress in understanding and experimenting with laboratory condensates (from the different phases of superfluid helium to the entire range of superconductors and ultra-cold gases). In this talk, I will provide an overview of what we know about superfluid and superconducting components in neutron stars, and suggest novel ways that we may make progress in understanding neutron star physics using the connections to terrestrial low-temperature condensates.