

Spring 2025 Colloquium

Physics and Astronomy, East Texas A&M University

Thursday, February 6, 2025

4:00 pm to 5:00 pm, McFarland Science Building 127

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

The secret life of quarks: from the lab to the cosmos

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Abstract

The strongest fundamental force of nature generates ~96% of the mass of the visible universe and binds together the building blocks of quantum chromodynamics, quarks and gluons, within the proton. At temperatures of a few trillion Kelvin or densities tens of trillions times more dense than iron, these quarks are no longer bound within protons and can form entirely new states of matter. It is possible to unlock these quark phases in heavy-ion collisions that reach the hottest temperatures on Earth or potentially in the core of the neutron stars that have densities many times larger than that of a nucleus. In this talk, we will explore different ways to study the phases of matter of quarks from the lab using heavy-ion collision and in the cosmos using X-Ray measurements of neutron stars or gravitational waves from binary neutron star mergers.



Dr. Jacquelyn Noronha-Hostler finished her PhD in Theoretical Physics at the Goethe University in Frankfurt in 2010, during this time she was also a visiting student at Columbia University from 2008-2009 and she received funding from FIAS, GRADED, and the ITP in Frankfurt. For her undergraduate degree she graduated Magma cum Laude from Berea College with a double major in Physics and Mathematics with a minor in German for which she was awarded the Waldemar Noll Scholarship in Physics, the Senior Mathematics Award, and travel funds from the DAAD, NSF, and the Benjamin A. Gilman International Scholarship. Following her PhD, she obtained a FAPESP postdoctoral fellowship at the University of Sao Paulo, followed by an Associate Research position at Columbia University, and a postdoctoral fellowship at the University of Houston. From 2017-2019 she was an Assistant Professor in the Physics and Astronomy Department at Rutgers University where she received the 2018 Alfred P Sloan Fellowship and the 2018 Department of Energy Early Career Award. In 2019 she joined the faculty at the University of Illinois Urbana Champaign as an Assistant Professor. She is currently on the executive committee for the American Physical Society's Division of Nuclear Physics and is a member of the BEST collaboration. She recently finished a 4-year term on the RHIC & AGS User's Executive Committee.