

Fall 2020 Colloquium

Department of Physics & Astronomy, A&M-Commerce

Sep 3, Thursday, 4-5 PM in a Zoom Virtual Meeting

<https://tamuc.zoom.us/j/92605940950>

Astrophysics

New Results on Stellar Neutrinos

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Frank Timmes is a Professor in the School of Earth and Space Exploration at Arizona State University. He has expertise in stellar astrophysics, nuclear astrophysics, chemical evolution, astrobiology, gamma-ray astronomy from radioactive isotopes, community-driven software instruments, and teaching large online astronomy courses. He is a Fellow of the American Physical Society and a Simons Fellow in Theoretical Physics. Frank provides service to the international astronomy & astrophysics community through the American

Astronomical Society Journals, where he has been a Scientific Editor since 2009, Lead Editor of the "High Energy Phenomena and Fundamental Physics" corridor since 2016, and driving content on the AAS YouTube channel, <https://www.youtube.com/c/AAStromony> since 2019. His website is <http://cococubed.asu.edu/>

Abstract

Stars radiate energy by releasing photons from the stellar surface and neutrinos from the stellar interior. In the stellar interior, weak reactions produce electron neutrinos by thermal processes, electron and positron captures on nuclei, and nuclear decays. Neutrinos interact feebly with baryonic matter, escaping from the star unhindered in circumstances where photons are trapped. Neutrino astronomy has been limited, so far, to the Sun, supernova 1987A, and blazar TXS 0506+056. However, the Super-Kamiokande with Gadolinium, Jiangmen Underground Neutrino Observatory, and XENON experiments usher in a new generation of multi-purpose neutrino detectors designed to open new avenues for potentially observing currently undetected neutrinos. In this talk we'll explore recent results on stellar neutrinos that provide new targets for current, forthcoming, and future generations of neutrino detectors, new estimates of the stellar neutrino background signal, and new opportunities for nuclear reaction data that can make sizable differences in stellar evolution.