PHYSICS & ASTRONOMY SEMINAR

"Numerical Simulations of Thin-Film Solar Cells with Novel Architectures"

Presented by:
Martin Spehar

Abstract: Solar cells are a promising clean and renewable energy alternative, by converting the suns energy via semiconductors. One type of solar cell that is gaining interest is thin-film solar cells, which typically has the lowest cost of production, but also has the lowest efficiency. Thin-film solar cells have two device configurations, stacked and all-back-contact (ABC). Stacked devices are multiple thin layers of semiconductor material stacked on top of each other. ABC devices have their contacts in the rear, which is the side opposite of the illuminated side. Rear contacts eliminate shadow losses caused by top contacts. ABC devices have two arrangements, substrate and superstrate layouts. Two sets of calculations were done with a substrate Lattice Back Contact (LBC) device, and two sets of calculations were done with a superstrate Interdigitated Back Contact (IBC) device. These calculations were done using COMSOL Multiphysics, which is a software that simulates a variety of physics phenomena. COMSOL uses the finite element method to approximate the performance metrics of the solar cells. The LBC and IBC calculations were compared to each other to determine whether one device is better than the other.

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"Variable Stars in the Globular Cluster M 107"

Presented by:
Justin Chapman

Abstract: Globular clusters are large formations that can contain hundreds of thousands of stars, some of which vary in luminosity over time. In globular cluster M 107, 26 variable stars have been found over 85 years, with 3 of these being field stars. 23 of the variable stars are RR Lyrae, as well as one Mira, one SX Phoenicis, and one red giant irregular variable. However, there has not been extensive observations to find long-period variable stars. Observations using the Bowling Green State University telescope will be used to find long-period variable stars in M 107 and determine their periods of variability, as well as attempt to find a period for the irregular variable already known. These observations will be used to update the General Catalogue of Variable Stars.

Thursday, April 1, 2021
4:00 pm
PSLB 112