PHYSICS & ASTRONOMY SEMINAR

"Numerical Simulation of Time Resolved Photoluminescence for Alumina/Cd (Se,Te) Double Heterostructures"

Presented by:

Jordan Fox

Abstract: Time resolved photoluminescence (TRPL) is a common characterization tool for semiconductors that provides information on minority carrier lifetime. However, the measured lifetimes can be several, coupled underlying mechanisms that are difficult to deconvolute, such as radiative recombination and non-radiative recombination in the bulk semiconductor and at interfaces between different materials. Numerical simulation of TRPL experiments can be used for hypothesis testing and to develop a better understanding of possible mechanisms. Simulations entail the time-dependent solutions of semiconductor transport equations by employing the finite element method. Here, we investigate the passivation of Cd(Se,Te) by Alumina through the use of injection level dependent TRPL simulations. A Double Heterostructure of Al2O3/Cd(Se,Te)/Al2O3 is used to isolate the interface effect. The time dependent model include variation of laser power. Surface recombination velocity, and mobility to mimic the experimental design. In my talk, I will compare numerical models of single photon excitation TRPL with varying parameters to experimental data collected at the National Renewable Energy Laboratory. A better understanding of Cd(Se,Te) interface passivation is important because it is leading absorber material in commercially available second generation thin-film photovoltaic technology.

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"Evolution of Protostellar Outflows"

Presented by:

Kassidy Howard

Abstract: Protostellar outflows, which are ubiquitous in the star formation process, remove mass and angular momentum from the forming star and trace the underlying mass accretion process. In an effort to better understand how outflows evolve and how they regulate star formation, we have previously measured the dynamical properties for a large sample of isolated protostellar outflows. The goal of this present research project is to assemble complete spectral energy distributions for each protostar, calculate evolutionary signatures for each object, and place them into a relative evolutionary sequence, so that we may study how outflows evolve as protostars evolve.

Thursday, March 18, 2021

4:00 pm

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