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“Modeling Electronic Processes in Semiconductors”

ABSTRACT:

Semiconductors exhibit peculiar electronic properties that can be finely tuned by stress engineering, doping or nano structuration. For these reasons, they are being used in a wide range of electronic and optoelectronic devices and form the pillars of our current technology. The performance of a device largely depends on the effectiveness of the electron and/or hole transport in its active material, the semiconductor. The charge carrier response to incoming energy, such as delivered by an electric field, is central to the semiconductor function. Understanding of the rate at which the carriers dissipate this incoming energy (carrier relaxation) is of prime importance in characterizing this response, and then predicting semiconductor properties and designing new devices.

This talk focuses on the modeling of electron and hole transport in polar III-V semiconductors, at the semi classical level using the Ensemble Monte Carlo method. This intuitive method enables the fundamental study of carrier energy relaxation, which is of prime importance in many applications such as next generation solar cells.

Biosketch:

Eric Tea is a post-doctoral associate at Virginia Tech in the Nuclear Engineering Program in the Department of Mechanical Engineering. He received a B.S. and a Master degree from Université Pierre et Marie Curie where he studied applied physics. He received a physics Ph.D. degree from Université Paris-Sud where he specialized in modeling semiconductors.