

## Light and Fast: Probing Carriers and Vibrations in 1D and 2D Materials



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**ABSTRACT:** Carbon nanotubes and 2D atomic membrane materials cut across many disciplines with their remarkable optical, thermal, mechanical, and electronic properties. In this talk we will examine cases when a combination of properties, e.g. optical and mechanical, are simultaneously important. First, we will discuss ultrafast optoelectronic measurements of graphene p-n junctions that probe the fundamental thermal relaxation processes for excited carriers. Next, we will discuss experiments where circularly polarized light creates a valley polarization in an MoS<sub>2</sub> monolayer, leading to a Hall effect in the absence of a magnetic field. Finally, we will discuss experiments where individual carbon nanotubes are picked up with micron sized tweezers. These tweezers double as electrical probes, allowing us to simultaneously study the optical, electronic, thermal, and vibrational properties of nanotubes as they are strained or buckled.

Thursday, April 17, 2014 / 3pm  
Hermann Haus Room, 36-428  
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