

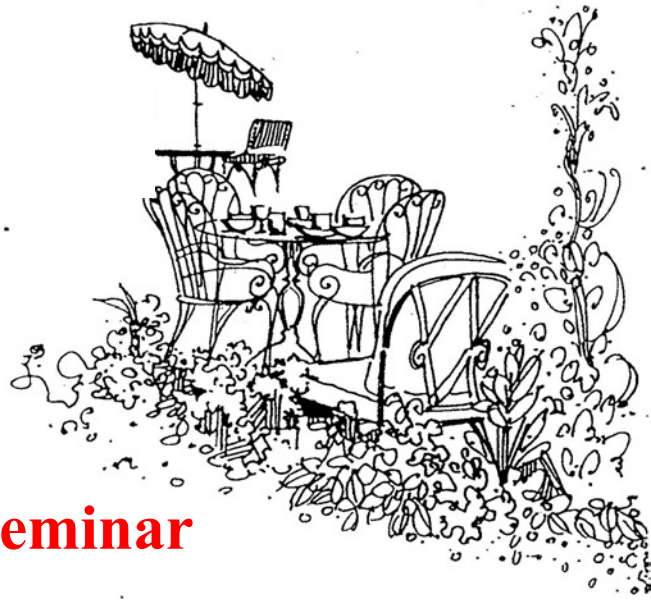
Chez Pierre

Presents ...

Monday, April 12, 2021

12:00pm Noon

Broadcast via Zoom



Chez Pierre Seminar

Dmitri N. Basov – Columbia University

"Live form New York: Programmable Quantum Materials"

Quantum materials offer particularly appealing opportunities for the implementation of on-demand quantum phases. This class of materials host interacting many-body electronic systems featuring an intricate interplay of topology, reduced dimensionality, and strong correlations that leads to the emergence of “quantum matter” exhibiting macroscopically observable quantum effects over a vast range of length and energy scales. Central to the nano-optical exploration of quantum materials is the notion of polaritons: hybrid light-matter modes that are omnipresent in polarizable media¹. Infrared nano-optics allows one to directly image polaritonic waves yielding rich insights into the electronic phenomena of the host material supporting polaritons. We utilized this novel general approach to investigate the physics of on-demand hyperbolic exciton-polaritons in a prototypical atomically layered van der Waals semiconductor WSe₂ in which polaritons are prompted by femto-second photo-excitation².

Bio.

Dmitri N. Basov (PhD 1991) is a Higgins professor and Chair of the Department of Physics at Columbia University [<http://infrared.cni.columbia.edu>], the Director of the DOE Energy Frontiers Research Center on Programmable Quantum Materials and co-director of Max Planck Society – New York Center for Nonequilibrium Quantum Phenomena. He has served as a professor (1997-2016) and Chair (2010-2015) of Physics, University of California San Diego. Research interests include: physics of quantum materials, superconductivity, two-dimensional materials, infrared nano-optics. Prizes and recognitions: Sloan Fellowship (1999), Genzel Prize (2014), Humboldt research award (2009), Frank Isakson Prize, American Physical Society (2012), Moore Investigator (2014, 2020), K.J. Button Prize (2019), Vannevar Bush Faculty Fellowship (U.S. Department of Defense, 2019), National Academy of Sciences (2020).

¹ D. N. Basov, Ana Asenjo-Garcia, P. J. Schuck, X. Zhu & Angel Rubio, “Polariton panorama” *Nanophotonics* 10, 549 (2021) <https://infrared.cni.columbia.edu/research/polariton-panorama-2-2/>

² A. J. Sternbach, S. Chae, S. Latini, A. A. Rikhter, Y. Shao, B. Li, D. Rhodes, B. Kim, P. J. Schuck, X. Xu, X.-Y. Zhu, R. D. Averitt, J. Hone, M. M. Fogler, A. Rubio, and D. N. Basov, “Programmable hyperbolic polaritons in van der Waals semiconductors” *Science* 371, 617 (2021).