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Chiral Induced Spin Selective Charge Transfer in 2D Semiconductor Heterostructures

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Date: Tuesday, November 10th, 2026

Time: 6:30-7:30 PM on Zoom

Place: Register to receive Zoom link:
https://suny-ow-edu.zoom.us/meeting/register/Xku0Alc_hQK-BxwG5MvO6zQ
Event is free of charge



Abstract: Atomically thin transition-metal dichalcogenides (TMDs) exhibit optoelectronic properties that are promising for next-generation photovoltaics, photodetectors, quantum sensors, and quantum computing. When combined with other semiconductors, TMDs can form heterostructures with enhanced or emergent properties, governed largely by the nature of their interfaces. Here, we demonstrate room-temperature valley polarization in heterostructures comprising monolayer MoS₂ and one-dimensional chiral lead-halide perovskites. This effect arises from the chiral induced spin-selective (CISS) charge transfer from MoS₂ to the chiral perovskites, which act as spin filters. Ultrafast pump–probe microscopy and helicity-resolved photoluminescence microscopy confirm this mechanism.

Biography: Dr. Mircea Cotlet earned a PhD in physical chemistry from Katholieke Universiteit Leuven in Belgium and conducted postdoctoral research at Harvard University and Los Alamos National Laboratory before joining Brookhaven in 2007. His research focuses on light–matter interactions, interfacial charge and energy transfer, and self-assembled hybrid nanomaterials for optoelectronics, sensing, and quantum applications. In 2019, he was named a Battelle Inventor of the Year for his contributions to the optical study of functional nanomaterials.

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