DEPARTMENT OF PHYSICS UNIVERSITY OF MARYLAND **CNAM** Condensed Matter Colloquium

2pm, **October 1st**, Room 1201

Spin Injection Hall Effect in a Photovoltaic Cell

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Electrical detection of spin-polarized transport in semiconductors is one of the key prerequisites for successful incorporation of spin in semiconductor microelectronics. The present schemes are based on spin-dependent transport effects within the spin generation region in the semiconductor, or on non-local detection outside the spin-injection area using a ferromagnet attached to the semiconductor. Here, we report that polarized injection of carriers can be detected by transverse electrical signals directly along the semiconducting channel, both inside and outside the injection area, without disturbing the spin-polarized current or using magnetic elements. Our planar p–n diode microdevices enable us to demonstrate Hall effect symmetries and large magnitudes of the measured effect. Supported by microscopic calculations, we infer that the observed spin-injection Hall effect reflects spin dynamics induced by an internal spin–orbit field and is closely related to the anomalous and spin Hall effects. The spin-injection Hall effect is observed up to high temperatures and our devices represent a realization of a non-magnetic spin-photovoltaic polarimeter that directly converts polarization of light into transverse voltage signals.

Host: Victor Galitski