



# Colloquium Notice

# Yonatan Dubi

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## *The chirality induced spin-selectivity effect: a puzzle and it's (possible) resolution*

A [Zoom Seminar](#) at the Department of Chemistry at Lehman College and the Department of Physics at Queens College

You are invited to a Zoom meeting.

When: Oct 30, 2024 12:00 PM Eastern Time (US and Canada)

Register in advance for this meeting:

<https://us06web.zoom.us/meeting/register/tZEpdOqrrjlqE9NIRUSU3N3IA04w99SvB6bs>

After registering, you will receive a confirmation email containing information about joining the meeting.

When electrons are injected through chiral molecules, the resulting current may become spin polarized. This effect, known as the chirality-induced spin-selectivity (CISS) effect, has been suggested to emerge due to the interplay between spin-orbit interactions and the chirality within the molecule. However, such explanations require unrealistically large values for the molecular spin-orbit interaction without any physical justification. Put simply, to date, the physical origin of the CISS effect is unknown.

I will present the “spinterface mechanism” for the CISS effect, based on the interplay between spin-orbit interactions in the electrode, the chirality of the molecule (which induces a solenoid field), and spin-transfer torque at the molecule-electrode interface. I will show the remarkable agreement between the spinterface theory and various experimental results, and will describe a set of “smoking gun” experiments for differentiating these mechanisms from other theoretical explanations. Finally, we will describe a spinterface mechanism for the CISS effect in photo-excited electrons scattered off a layer of chiral molecules.

[1] S. Alwan & Y. Dubi, Spinterface Origin for the Chirality-Induced Spin-Selectivity Effect, *J. Am. Chem. Soc.* 143, 35, 14235-14241 (2021)

[2] Y. Dubi, Spinterface chirality-induced spin selectivity effect in bio-molecules, *Chem. Sci.*, 13, 10878-1088 (2022).

[3] C. Yang, Y. Li, S. Zhou, Y. Guo, C. Jia, Z. Liu, K. N. Houk, Y. Dubi & X Guo, Real-time monitoring of reaction stereochemistry through single-molecule observations of chirality-induced spin selectivity, *Nature Chemistry* 15, 972-979 (2023)

[4] Seif Alwan, Subhajit Sarkar, Amos Sharoni, Yonatan Dubi, Temperature-dependence of the CISS effect from measurements in Chiral molecular intercalation super-lattices, *J. Chem. Phys.* 159, 014106 (2023).

[5] S. Alwan, A. Sharoni & Y. Dubi, Role of Electrode Polarization in the Electron Transport Chirality-Induced Spin-Selectivity Effect, *J. Phys. Chem. C* 128, 15, 6438-6445 (2024).

Wednesday

**October 30, 2024**

Starts at 12:15 PM

This talk is accessible via [Zoom](#) or use

**meeting ID 829 2687 2594** and **passcode 866995** to join

