

Physical Chemistry Seminar

Tuesday,
September 15, 2015

11:00 am

Room 1315
Chemistry Building

What do to when the (fluorescent) lights go out: toward single-molecule spectroscopy using optical microresonators



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Single-molecule measurements are a powerful means of uncovering unsynchronized chemical dynamics and revealing electronic structure. However, experimental limitations have generally restricted single-molecule investigations to situations where targets are strongly emissive, a tremendously restricting limitation. In this presentation, I will describe a new type of single-molecule spectrometer, where we take advantage of the remarkable sensitivities of ultrahigh-Q optical microresonators as photothermal detectors. The evolution of the methodology will be discussed, including illustrative example whereby we probe individual carbon nanotubes and gold nanorods. I will show how our technique enables the first electronic spectroscopy measurements on individual doped conjugated polymer molecules, thus allowing systematic exploration of how the electronic properties of a thin film evolve from its molecular components. Finally, I will discuss future strategies for enabling our technique to continue to push the limits of sensitivity and time-resolution.

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

