**WATER:**

**Oxygen Dynamics of Ecosystems monitored over Minute to Yearly Timescales**

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Dissolved oxygen is the most important water quality variable to monitor in coastal and terrestrial water bodies according to the US Geological Survey. This talk will describe a novel optical oxygen sensing technology based on phosphorescence quenching by 3O2 of inorganic metal-halide indicators. We have developed a dissolved oxygen (DO) sensor for water as well as *in-situ*, or direct, measurements in saturated and unsaturated soils. It consists of time-resolved spectrometer for continuous outdoor operation from 0 - 30°C.

We highlight our collaborative work with hydrologists, bio-geochemists and water treatment facilities on applications of the high-frequency (∆t=5min) DO time-series obtained continuously over 5 years and counting. First, “watching the tides roll in” a longitudinal study of salt water inundation of a former freshwater marsh. Secondly, oxygen dynamics within the sediment of an alpine river during two distinct snow-melt seasons. Thirdly, potential energy savings from real-time DO monitoring in Genesse County, MI waste water treatment plants. Finally, I will describe how I am using the “tool-box” of a condensed mater physicist to study the role of oxygen in our water.

*Condensed Matter Physics Seminar*

*April 21, 2025*

*4:00pm*

*BPS 1400*

*Michigan State University*