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[Session V23: Low emperature Instrumentation](#)

2:30 PM–4:18 PM, Thursday, March 7, 2019

BCEC Room: 158

Sponsoring Unit: GIMS

Abstract: V23.00007 : Temperature sensing via photoluminescence lifetimes of Rhodamine B*

3:42 PM–3:54 PM

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Non-invasive temperature probes have use in many settings where conventional thermometers may not be suitable or as efficient. An optical temperature probe is a material whose optical properties, such as photoluminescence (PL) or PL lifetime, are known as a function of temperature. We present results of PL lifetime studies of the organic dye Rhodamine B, which is a good candidate for use in temperature probes due to its large PL emission. We have measured PL lifetimes using time correlated single photon counting (TCSPC). The lifetimes were measured from temperatures of 15 K to 330 K. The lifetimes appear to be non-monotonic: they increase with temperature to a point, then decrease again. It is uncertain what is causing this unexpected trend, and we are in the process of verifying these lifetime measurements as well as studying other possible luminescent materials such as semiconductor quantum dots for application as temperature probes.

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