

Abstract Submitted  
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**Study of evaporating droplet temperature in low pressure plasma**<sup>1</sup> DAISUKE OGAWA, MATTHEW GOECKNER, LAWRENCE OVERZET, University of Texas at Dallas — A key parameter of misty plasmas is the temperature ( $T_d$ ) of the liquid droplets in the plasma.  $T_d$  determines the rate at which droplets evaporate and is a consequence of the energy balance between plasma species which bring thermal energy and droplet evaporative cooling. We are using Rhodamine B (RhB) to estimate  $T_d$  because the spectrum of this dye is known to be  $T_d$  dependent. For example: RhB has been used to study the temperature of dust in plasmas and fuel droplets in combustion. A complication is that there are at least two major differences between dust particles and liquid droplets in plasmas: [1] droplets evaporate which changes their RhB concentration in time and [2] droplets are expected to be as much as 150 C cooler than dust grains. Both make calibration more difficult. In this poster, we will present our progress in using this technique to estimate the temperature of evaporating droplets in low pressure plasma. This will include our calibration procedures, the RhB spectral dependencies (concentration, and T) and measurements of both droplet evaporation kinetics as well as RhB spectra in vacuum and plasma.

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