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The technique to measure the internal temperature of particulates/droplets: Two-color laser induced fluorescence[1] DAISUKE OGAWA, LAWRENCE OVERZET, MATTHEW GOECKNER, The University of Texas at Dallas — In a multi-phase plasma (such as dusty plasma and plasma spray etc.), it is important to know the internal temperature of particulates. This is because the temperature affects chemical properties of the particulates. For example, it affects the chemical reaction rate, the material state, the vapor flux etc. Among some techniques to measure the temperature, we selected the technique called two-color laser induced fluorescence (2cLIF) in order to find the droplet temperature in argon plasma. In fact, the use of two wavelengths for the particulate pyrometery is known. This technique uses the ratio of two fluorescent intensities which emit from dye (rhodamine b) in the droplets. The ratio cancels out some unknown parameters (optical constants, incident intensity etc.) and depends on the particulate temperature. Our preliminary measurements showed that the ratio of the intensity at 580 to 605 nm monotonically decreased as the liquid temperature increased. Currently, we found the temperature decreased approximately 40 to 70 degrees C at low pressure (100 mTorr, no plasma) compared to droplets injected to atmospheric pressure. In our poster, the theory behind the technique and the actual measurements with the technique will be shown.

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