

Abstract Submitted  
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**A Simple Photo-resistor sensor for detection and characterization of droplets** MOHAMMAD SHAHAB, ANSHUL VERMA, RAGHUNATHAN RENGASWAMY, Indian Institute of Technology Madras, SYSTEMS ENGINEERING OF THE NATURAL AND THE ARTIFICIAL AT IIT MADRAS TEAM — This work describes a method which utilizes the difference in optical properties (i.e. transmittance) of continuous and dispersed phase to detect droplets in a milli-channel made of PDMS using a sensor i.e. Light Dependent Resistor (LDR) and a light source i.e. Light Emitting Diode (LED). Due to low cost and footprint, LDR is a viable option. LDR also covers the entire spectrum in visible range and gives satisfactory response as opposed to planar diffused photo-diodes which respond only to a limited wavelength-band. Any change in the transmittance of the fluid flowing in the channel changes the intensity of light falling from the LED on LDR resulting in a resistance change in LDR. Droplet detection corresponding to the peaks in the sensor signal due to change in the resistance of LDR is established by comparing the sensor data with the video-processed data. After sensor validation, peak features such as peak height, width and saturation voltage are studied to measure droplet size, velocity and spacing. As an application of this multiphase flow detection, it has been shown that droplets can be classified on the basis of their chemical properties using Beer-Lambert law.

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