Abstract Submitted
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Novel Indirect Particle Temperature Measurement Methodology Using IR and Visible-light Cameras[1] JESUS ORTEGA, GUILLERMO ANAYA, University of New Mexico, CLIFFORD HO, Sandia National Labs, PETER VOROBIEFF, GOWTHAM MOHAN, University of New Mexico — The particle temperature measurements in a gravity-driven flows present a unique challenge due to its transient nature and flow's stochastic. While attempts to estimate the bulk particle temperature have been conducted using contact and non-contact methods, a definitive and practical solution is yet to be found. This work focuses on a novel non-contact method using a high-speed IR camera and a visible-light camera (Nikon D3500) to accomplish this indirect particle temperature measurement. The thermograms and image sets collected by the cameras allow for the measurement of the apparent particle temperature and the opacity of a particle plume. An in-house post-processing code based on Planck's theory allows to calculate the true particle temperature from the apparent temperature obtained from the thermograms. The particle temperature data are compared with the empirical model of the bulk particle temperature yielding agreement with 95% confidence (2σ).

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