Abstract Submitted
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Velocity Vector Field Extraction from High Speed Thermograms through Particle Image Velocimetry Tools[1] GUILLERMO ANAYA, JESUS ORTEGA, IRMA VAZQUEZ, ADRIAN CEDERBERG, PETER VOROBIEFF, University of New Mexico, CLIFFORD HO, Sandia National Laboratories — Particle Image Velocimetry (PIV) is commonly used to extract velocity from a flow field. While these assessments are usually performed using high-speed visible cameras with tracers, experiments performed at the University of New Mexico generate extensive sets of time-resolved thermograms of a falling hot particle curtain captured at 300 Hz. These sets of data have been analyzed with two commonly used PIV analysis packages, DaVis and PIVlab. The comparison showed consistent velocity fields and contours, along with corresponding velocity correlations as a function of flow position. As expected, the vertical velocity component of these gravity-driven curtains follows a trend that resembles a free-falling sphere rather than a falling sphere experiencing drag. The variation of velocity magnitude displayed negligible variations due to the curtain thickness and/or inlet particle temperature which can be considered negligible for the application. The results obtained will feed the development of a statistical model to estimate the mass flow of a particle curtain using only image-correlation methods.

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