

Abstract Submitted
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Particle Sorting by Aerodynamic Vectoring¹ ZACHARY HUMES, BARTON SMITH, Utah State University — An experimental and numerical demonstration of a new, non-contact particle sorting technique called Aerodynamic Vectoring Particle Sorting (AVPS) is presented. AVPS uses secondary blowing and suction control flows to sharply turn a 2D, particle-laden jet. As the jet is turned, particles present in the flow experience a resultant force, dependent upon their size and due to the combined effects of pressure, inertia, and drag. Since the balance of these forces determines the particle's trajectory, turning the flow leads to a separation of particles downstream. This simple, low-pressure-drop sorting technique classifies particles with less risk of damage or contamination than currently available sorting devices. AVPS is experimentally demonstrated using a rectangular air jet. Particle size and trajectory are measured using the Shadowgraphy method. Numerical simulations are performed using the commercial CFD solver FLUENT to calculate the 2D turbulent vectored jet flow field using a RANS approach. Examination of the mean and the standard deviation of measured and computed particle trajectories is used to determine the range of particle sizes that can be effectively sorted using AVPS.

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