

Using Divergent Nozzle with Aerodynamic Lens to Focus Nanoparticles

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Abstract : ANSYS Fluent will be used to simulate Computational Fluid Dynamics (CFD) for an efficient lens and nozzle design which will be explained in this paper. We have designed and characterized an aerodynamic lens and a divergent nozzle for focusing flow that transmits sub 25 nm particles through the aerodynamic lens. The design of the lens and nozzle has been improved using CFD for particle trajectories. We obtained a case for calculating nanoparticles (25 nm) flowing through the aerodynamic lens and divergent nozzle. Nanoparticles are transported by air, which is pumped into the aerodynamic lens through the nozzle at 1 atmospheric pressure. We have also developed a computational methodology that can determine the exact focus characteristics of aerodynamic lens systems. Particle trajectories were traced using the Lagrange approach. The simulation shows the ability of the aerodynamic lens to focus on 25 nm particles after using a divergent nozzle.

Keywords : aerodynamic lens, divergent nozzle, ANSYS Fluent, Lagrange approach

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