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Characterization of Inertial Particles in Turbulent Axisymmetric Wakes of a Porous Disk KRISTIN TRAVIS, SARAH E. SMITH, Portland State University, MICKAL BOURGOIN, ENS Lyon, HENDA DJERIDI, LEGI - Laboratoire des coulements Gophysiques et Industriels, RAL BAYON CAL, Portland State University, MARTIN OBLIGADO, LEGI - Laboratoire des coulements Gophysiques et Industriels — Previous studies have suggested that dense particles such as dust and precipitation affect wind turbine performance. This study investigates the effects of micrometric inertial particles in the turbulent axisymmetric wake behind a stationary porous disk in a wind tunnel. Recent studies have explored turbulent wakes of stationary porous disks as analogs to the wakes of moving rotors yet inertial particles have not been considered. Phase doppler interferometry and particle image velocimetry were implemented in the near and far wake regions to study the effect of turbulent wakes on the transport of water droplets (with a mean diameter of 60m). Reynolds numbers and water volume fractions were tested over ranges $[Re_D\ (17.7 \times 10^3 - 98.6 \times 10^3)]$ and $[\phi_v\ (3.9 \times 10^{-6} - 2.6 \times 10^{-5})]$ respectively. Results on the size distribution of particles within the wake, their settling velocity and the preferential concentration are discussed, showing a complex dynamics of such particles, as small particles are entrained and trapped in the near wake.

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