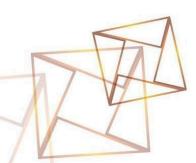
TATA INSTITUTE OF FUNDAMENTAL RESEARCH



ICTS M.Sc Project Seminar

Title : Impact of the Basset History Force on Inertial Particle Dynamics in a Taylor-Green Vortex

Flow

Speaker: Shasvat Venkata Vudumula (ICTS-TIFR, Bengaluru)

Date: Tuesday, 29 April 2025

Time : 2:00 PM (IST)

Abstract: We investigate how the often ignored Basset history force alters inertial particle motion in a

steady Taylor-Green vortex. High-resolution simulations integrate the full Maxey-Riley-Gatignol equation with an efficient RK-XTD scheme and compare the results with a Stokes-only variant that omits the non-local Basset term. Trajectories are tracked to nondimensional time T=150 across a broad Stokes number range for light (R=1.1) and heavy (R=1000) particles. The history force removes the permanent vortex trapping predicted by simplified models and measurably reshapes dispersion at T=150, with sensitivity to both density ratio and inertia. For many cases, paths remain intricate yet non-trapped, diverging markedly from Stokes-only behaviour. The results demonstrate that retaining the Basset force is essential for reliable forecasts of particle distribution over finite

timescales.

Venue : Online

Zoom Link: https://icts-res-in.zoom.us/j/93338316562?pwd=4THobMblbzeTVyyIzfbtdUuw926Owg.1

Meeting ID: 933 3831 6562

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