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Experimental investigation of flow past a sphere with trip¹ RAHUL DESHPANDE, ADITYA DESAI, Indian Institute of Technology Kanpur, Kanpur, U.P, India, VIVEK KANTI, National Wind Tunnel Facility, Indian Institute of Technology Kanpur, Kanpur, U.P., India, SANJAY MITTAL, Indian Institute of Technology Kanpur, Kanpur, U.P, India — The flow over a smooth sphere and a sphere with a trip was experimentally investigated in the Reynolds number range 1×10^5 to 5×10^5 through unsteady force measurements. The size of the trip is 1.5 percent of the diameter D of the sphere and measurements are made for its streamwise location from the stagnation point for 10, 20 and 30 degrees. The statistics of the drag and lateral forces were studied for a range of subcritical to supercritical Reynolds numbers to understand the effect of a trip on the critical flow regime of a sphere. Two different flow characteristics are observed over the sphere surface depending on the streamwise location of the trip. For subcritical Reynolds numbers, a significant mean side force is observed in the direction of the trip side of the sphere. On gradually increasing the Reynolds number, the flow over the sphere enters the critical regime and the direction of the side force reverses from the trip side to the non - trip side of the sphere which continues to be observed well within the early supercritical regime.

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