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Vapor layers reduce drag without the crisis IVAN VAKARELSKI, King Abdullah University of Science and Technology, JOSEPH BERRY, DEREK CHAN, University of Melbourne, SIGURDUR THORODDSEN, King Abdullah University of Science and Technology — The drag of a solid sphere moving in fluid is known to be only a function of the Reynolds number, Re and diminishes rapidly at the drag crisis around Re $\sim$ 3 10^5. A Leidenfrost vapor layer on a hot sphere surface can trigger the onset of the drag crisis at lower Re. By using a range of high viscosity perfluorocarbon liquids, we show that the drag reduction effect, can occur over a wide range of Re, from as low as $\sim$ 600. The Navier slip model with a viscosity dependent slip length captures the observed drag reduction and wake shape.

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