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Quantum Computation of Fluid Dynamics SACHIN S. BHARADWAJ, KATEPALLI R. SREENIVASAN, New York Univ NYU — Studies of strongly nonlinear dynamical systems such as turbulent flows call for superior computational prowess. With the advent of quantum computing, a plethora of quantum algorithms has in some instances demonstrated, both theoretically and experimentally, higher computational efficiency than their classical counterparts. Starting with a brief introduction to quantum computing, we will distill from the huge spectrum of quantum computational methods a few key tools and algorithms, and evaluate possible approaches of Quantum Computation of Fluid Dynamics (QCFD). We will motivate this new direction by attempting to solve simple but important flow(s) such as the Stokes flow, using specific quantum-numerical integration schemes. We shall also shed some light on possible, and preliminary, "quantum steps" towards the Navier-Stokes equation.

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