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Numerical study on the interaction between supercavitation and turbulence HAN LIU, University of Minnesota and Peking University, ZUOLI XIAO, Peking University, LIAN SHEN, University of Minnesota — Supercavitation uses a bubble of gas inside a liquid large enough to encompass an object travelling through the liquid so that the skin friction on the object can be greatly reduced and high speed can be obtained. In this study, computational fluid dynamics is used to investigate the interaction between supercavitation and turbulence. The study builds on an in-house simulation code that uses the coupled level set and volume of fluid method to accurately capture the interface between the water and gas phases. A ventilated disk cavitator is used for the bubble generation, and it is modelled by a sharp interface immersed boundary method. Turbulence in the incoming flow is generated by a grid of small spheres upstream. Based on the simulation data, the influence of turbulence on the supercavitation and the underlying mechanisms are analyzed.

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