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**The Role of Spontaneous Parity-Time Symmetry Breaking in the Kelvin-Helmholtz Instability**<sup>1</sup> YICHEN FU, HONG QIN, Princeton Plasma Physics Laboratory, Princeton University, Princeton, NJ 08543 — Parity-Time (PT) symmetry is an active research topic in both quantum and classical physics. It was recently pointed out [Qin et al., *Physics of Plasmas* 26, 032102 (2019)] as a general principle that conservative classical systems admit PT-symmetry, and become unstable when and only when PT-symmetry is broken spontaneously. In the present study, we demonstrate that this is indeed the case for the Kelvin-Helmholtz instability in a shear flow system with a smoothly varying flow profile. The nontrivial PT-symmetry of the system is identified, and numerically calculated eigenmodes show that the PT-symmetry is preserved for stable modes and spontaneously broken for unstable modes. The method of PT-symmetry physics enables new tools in the study of instabilities in classical fluids and plasmas.

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