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**Interface dynamics: New mechanisms of stabilization and destabilization and structure of flow fields**[1] D.V. ILYIN, W.A. GODDARD, California Institute of Technology, USA, S.I. ANISIMOV, Landau Institute for Theoretical Physics, Academy of Science, RF, SNEZHANA ABARZHI[2], The University of Western Australia, AUS — Interfacial mixing and transport are nonequilibrium processes coupling kinetic to macroscopic scales. They occur in plasmas, fluids, and materials over celestial events to atoms. Grasping their fundamentals can advance a broad range of disciplines in science, mathematics, and engineering. This work focuses on the long-standing classic problem of stability of a phase boundary - a fluid interface that has a mass flow across it. We briefly review the recent advances and challenges in theoretical and experimental studies, develop the general theoretical framework directly linking the microscopic interfacial transport to the macroscopic flow fields, discover the new mechanisms of interface stabilization and destabilization for both inertial and accelerated dynamics, and chart perspectives for future research.

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