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Quantum Turbulence Arising from Countersuperflow Instability in Miscible Two-component Bose-Einstein Condensates[1] HIROMITSU TAKEUCHI, SHUNGO ISHINO, MAKOTO TSUBOTA, Osaka City Univ — Turbulence is one of the great unsolved problems in physics. Quantum turbulence (QT) in superfluids is expected to give a prototype of turbulence much simpler than usual classical turbulence and has recently become one of the most important fields in low-temperature physics. Recent development of experimental technique enable us to study QT in atomic Bose-Einstein condensates (BECs). Recently, we proposed that countersuperflow, a flow state of miscible superfluids with a relative velocity, can lead to turbulence after the characteristic instability development of vortex nucleation and vortex reconnection in miscible two-component BECs [1, 2]. QT of two-component BECs can provide another prototype of turbulence because eddies in classical turbulence may be mimicked by vorticity distribution without singularity in this system. In this presentation, we will report on our numerical analysis of the parameter dependence of the statistical property, such as energy spectrum and enstrophy distribution, of the QT arising from countersuperflow instability (CSI) in two-component condensates. [1] Hiromitsu Takeuchi, Shungo Ishino, and Makoto Tsubota, Phys. Rev. Lett. 105, 205301 (2010). [2] Shungo Ishino, Makoto Tsubota, and Hiromitsu Takeuchi, Phys. Rev. A 83, 063602 (2011).

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