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**Large-scale columnar vortices in rotating turbulence**[1] NAOTO YOKOYAMA, Kyoto University, MASANORI TAKAOKA, Doshisha University
— In the rotating turbulence, flow structures are affected by the angular velocity of the system's rotation. When the angular velocity is small, three-dimensional statistically-isotropic flow, which has the Kolmogorov spectrum all over the inertial subrange, is formed. When the angular velocity increases, the flow becomes two-dimensional anisotropic, and the energy spectrum has a power law $k^{-2}$ in the small wavenumbers in addition to the Kolmogorov spectrum in the large wavenumbers. When the angular velocity decreases, the flow returns to the isotropic one. It is numerically found that the transition between the isotropic and anisotropic flows is hysteretic; the critical angular velocity at which the flow transitions from the anisotropic one to the isotropic one, and that of the reverse transition are different. It is also observed that the large-scale columnar structures in the anisotropic flow depends on the external force which maintains a statistically-steady state. In some cases, small-scale anticyclonic structures are aligned in a columnar structure apart from the cyclonic Taylor column. The formation mechanism of the large-scale columnar structures will be discussed.

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