

Abstract Submitted
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Structure formation of thermally driven turbulence¹ YOHEI KAWAZURA, ZENSHO YOSHIDA, Graduate School of Frontier Sciences, The University of Tokyo — Self-organized structures in plasma turbulence, such as zonal flow and streamer, play important roles in terms of confinement in fusion devices. Recently thermodynamical approaches to dictate self-organization are proposed. Yoshida and Mahajan explained the bifurcation to “High confinement mode” in magnetically confined fusion device by using thermodynamic model [1]. The nonexact term available to generate vorticity in equation of motion is baroclinicity ($T\nabla S$). Assuming circulation of the fluid element as cycle of heat engine, fluid mechanics and thermodynamic laws can be connected. In this study, by solving the fluid equation of motion as specific mechanical process, we investigate the connection between thermal driving of turbulence and self-organization of vortical structures.

[1] Z. Yoshida and S. M. Mahajan, Phys. Plasmas 15, 032307 (2008).

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