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**Reconnections of magnetic and vortex surfaces in magnetohydrodynamic Taylor-Green Flows**[1] JINHUA HAO, YUE YANG, State Key Laboratory for Turbulence and Complex Systems, College of Engineering, Peking University, Beijing 100871, China — We investigate the reconnections of magnetic and vortex surfaces in three-dimensional magnetohydrodynamic Taylor-Green (MHD-TG) flows using the magnetic-surface field (MSF) and vortex-surface field (VSF). Both MSF and VSF are Lagrangian-based structure identification methods rooted in Alfven and Helmholtz theorems, whose isosurfaces are magnetic and vortex surfaces consisting of magnetic and vortex lines, respectively. The time and location of magnetic reconnection are quantitatively determined from the characterization of topological changes of magnetic surfaces. Similarly, the vortex reconnection is also quantified. In particular, the influence of the Lorentz force on the motion of vortex surfaces is partly considered as a hypothetical convection of VSFs. Furthermore, we elucidate the relationship between the energy transfer and structural evolution of magnetic and vortex surfaces in MHD-TG flows.

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