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# Magnetorotational Dynamos in Turbulent Accretion Disks

Understanding the intricate network of nonlinear interactions crucial for the development and sustenance of turbulence induced by magnetorotational instability (MRI) has proven challenging. A large-scale dynamo, generating dominant azimuthal magnetic fields, emerges as a pivotal component of this turbulence. Direct numerical simulations of MRI dynamo have revealed statistical self-organization into large-scale cyclic dynamics. However, comprehending the underlying physics of these statistical states and assessing their astrophysical significance present theoretical hurdles. Through our newly developed direct statistical simulations, we have successfully identified several new dynamo mechanisms responsible for generating different components of large-scale magnetic fields. In this talk, I will delve into the fundamental physics associated with the dynamo cycle and elucidate the properties and implications of the resulting cyclic patterns within turbulent accretion disks.

References

[1] Mondal T., Bhat P., Phys. Rev. E 108, 065201 (2023).

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