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Viscous heating in $E \times B$ type devices[1] MIKHAIL MLODIK, ELIJAH KOLMES, IAN OCHS, NATHANIEL FISCH, Princeton Plasma Physics Laboratory — In a variety of cylindrical plasma devices with axial magnetic fields, a radial electric field gives rise to plasma rotation. This E x B rotation also heats the plasma through viscous effects. In the recently proposed wave-driven rotating torus (WDRT), this viscous heating is thought to be manageable in creating, in principle, economical fusion power [1]. Here, we explore viscous heating both in the WDRT and, more generally, in devices where the primary dynamics is governed by the E x B rotation of plasma. In particular, we explore which species are primarily heated, in both cylindrical and toroidal geometry. We discuss the dependence of the heating on a variety of parameters, such as collisionality, speed of rotation, temperature and ion mix. [1] J. M. Rax, R. Gueroult, and N. J. Fisch, Physics of Plasmas 24, 032504 (2017)

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