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**Moderately Magnetized Relativistic Reconnection Is Very Different in 3D**[1] GREGORY WERNER, DMITRI UZDENSKY, University of Colorado, Boulder — We used particle-in-cell simulation to study magnetic reconnection in 3D collisionless relativistic electron-positron plasmas relevant to astrophysical sources such as pulsar wind nebulae and blazar jets. Although 3D reconnection is similar to 2D when the upstream magnetization is large (low plasma beta), significant differences emerge in the regime of moderate magnetization (beta near 1). For large magnetization, plasmoids grow and merge hierarchically in reconnection outflows for both 2D and 3D, and energy conversion rates and nonthermal particle acceleration (NTPA) are nearly identical in 2D and 3D. This holds for both weak and strong guide magnetic fields. However, for moderate magnetization and weak guide field, 3D reconnection is different; small plasmoids (flux ropes) form as in 2D, but instead of growing and merging, they dissipate in an increasingly turbulent current sheet. Magnetic energy release is slower in 3D, but eventually upstream magnetic energy is converted more completely to plasma energy, because little magnetic energy winds up in flux ropes. Despite the lower reconnection rate, NTPA remains robust in 3D, and possibly slightly enhanced. A stronger guide magnetic field, however, causes 3D reconnection to behave more similarly to 2D reconnection.

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