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Knot cycles in (3+1)D topological phases SYED RAZA, SHARMISTHA SAHOO, JEFFREY C. Y. TEO, University of Virginia — Multi-component knots in 3D can be tangled with trivial mutual linking number, for example the Borromean ring, Whitehead link, Brunnian link and chain. In topological phases, topological strings such as vortices and line defects can carry low energy quasi-(1+1)D electronic degrees of freedom. Moreover, they can exhibit non-trivial mutual statistics with other quasi-particles and quasi-strings. We consider the non-trivial knot cycles of these topological strings in (3+1)D topological phases, moving one of the strings cyclically in time around the rest of the knot configuration, and study their quantum statistical behaviors. In particular, we focus on their non-abelian statistics and non-local adiabatic pumping.

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