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**Eric Carson Rowell\*** ([rowell@math.tamu.edu](mailto:rowell@math.tamu.edu)). *Braiding Necklaces and Loops.*

Unitary representations of the braid group arise as quantum gates in the topological model for quantum computation via particle exchange in 2-dimensional phases of matter. In 3 spacial dimensions, exchanging point-like particles is not very promising from this perspective since the topology of  $\mathbb{R}^3$  with points deleted is not interesting. However loop-like excitations can have non-trivial exchange statistics. I will describe some recent explorations on representations of the motion groups of free loops as well as loops confined concentrically to an auxiliary loop in  $\mathbb{R}^3$ . This is based on joint work with several sets of authors. (Received September 26, 2017)