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**Braiding Majorana states in helical magnetic atom chains** CHING-KAI CHIU, MOHAMMAD VAZIFEH, MARCEL FRANZ, Department of Physics and Astronomy, University of British Columbia — A helical magnetic atom chain deposited on the top of a superconductor can be realized as a 1D topological superconductor. We propose an innovative braiding protocol for Majorana zero modes at the ends of the magnetic chains for topological quantum computing. Braiding of exchanging particles can be implemented by moving only a *single* Majorana mode from one end to the other end. During the movement, the other Majorana mode teleports to the beginning position of the moving Majorana mode due to the finite size coupling of Majorana modes. Furthermore, the operation of changing the signs of the two Majorana modes can be achieved by rotating the direction of the magnetic moments by pi without moving Majorana modes at the ends.

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