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The Aharonov-Bohm effect in Möbius rings[1] ZEHAO LI, L. RAMDAS RAM-MOHAN, Worcester Polytechnic Institute, CENTER FOR COMPUTATIONAL NANOSCIENCE TEAM — Electron transmission through finite-width 2D ring structures is calculated for cylindrical, flat (Aharonov-Bohm), and Möbius rings. In the presence of an external magnetic field, curves of constructive transmission display a pattern similar to that for a 1D ring. The periodicity in the magnetic flux, in units of h/e, is weakly broken on 2D rings of finite width, so that a description with a 1D-path is very acceptable. The unusual states with half-integer values of $\langle L_z \rangle$ observed on Möbius rings, display a different characteristic in transmission. Such resonant states are in constructive interference for transmission at magnetic fields where the contribution from ordinary states with integer $\langle L_z \rangle$ is in destructive interference, and vice versa. This leads to an alternating dominance of the set of half-integer $\langle L_z \rangle$ states and the set of integer $\langle L_z \rangle$ states in transport with increasing magnetic fields. We anticipate that Möbius rings would be synthesized with graphene ribbons in the near future.

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