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Chiral fermion on curved domain-wall

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We consider a massive fermion system having a curved domain-wall
embedded in a square lattice.
As already reported in condensed matter physics, the massless chiral edge modes
appearing at the domain-wall feel “gravity” through the induced spin
connections.
In this work, we embed S^1 and S^2 domain-wall into Euclidean space
and show how the gravity is detected from the spectrum of the Dirac operator.
We also discuss how we can understand gravitational anomaly inflow
and index theorem with nontrivial curvature of the domain-wall.

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