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Schwinger pair creation in graphene wormhole

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We investigate the behavior of Dirac Particle (electron and hole) confined on the surface of graphene wormhole, specifically, curvature induced by the geometry of graphene wormhole.
For calculation, we use numerical shooting method of finding eigenvalue of the Dirac equation in a curved space of graphene wormhole.

Our numerical results demonstrate that energy of band structures of the particle depend on the geometrical parameters of graphene wormhole
and appear to the periodic spin-orbit potential, corresponding to Zeeman effect.

The geometrical parameters and quantization of momentum in the circumference direction specify a quantum state of particle as a bound state particle or a unbound state particle.
Finally effects of the geometrical parameter of graphene wormhole on the Schwinger pair creation of particle are presented.

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