Holographic Fermions in Striped Phases

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Abstract

We investigate holographic fermions in uni-directional striped phases, where the breaking of translational invariance can be generated either spontaneously or explicitly. We solve the Dirac equation for a probe fermion in the associated black hole background. When the spatial modulation effect becomes sufficiently strong, we see a gradual disappearance of the Fermi surface along the symmetry breaking direction, in all of the cases we have examined. The resulting Fermi surface appears to consist of detached segments, a phenomenon reminiscent of Fermi arcs. This effect appears to be a generic consequence of strong inhomogeneities, independently of whether translational invariance is broken spontaneously or explicitly.