

Abstract Submitted  
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**Dirac Loops in Carbon Allotropes**<sup>1</sup> KIERAN MULLEN, BRUNO UCHOA, Homer L. Dodge Department of Physics and Astronomy, University of Oklahoma, D. GLATZHOFFER, Department of Chemistry and Biochemistry, University of Oklahoma — We propose a family of structures that have “Dirac loops”: closed lines in momentum space with Dirac-like quasiparticles, on which the density of states vanishes linearly with energy. The structures all possess the planar trigonal connectivity present in graphene, but are three dimensional. We discuss the consequences of their multiply-connected Fermi surface for transport, including the presence of three dimensional Integer Quantum Hall effect. In the presence of spin-orbit coupling, we show that those structures may have topological surface states. We discuss the feasibility of realizing the structures as an allotrope of carbon.

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