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Emergence of atypical magnetic and electronic properties in graphitic nanowiggles VINCENT MEUNIER, Rensselaer Polytechnic Insitute, EDUARDO COSTA-GIRAO, Universidade Federal do Ceará, LIANGBO LIANG, Rensselaer Polytechnic Insitute, EDUARDO CRUZ-SILVA, University of Massachussetts, Amherst, ANTONIO GOMES SOUZA FILHO, Universidade Federal do Ceará —
Graphitic nanowiggles (GNWs) are periodic repetitions of non-aligned finite-sized graphitic nanoribbon domains seamlessly stitched together without structural defects. These complex nanostructures have been recently fabricated using the self-assembly and subsequent fusion of small aromatic compound (Nature **466**, 470 (2010)). The structures are predicted to possess unusual properties, such as tunable bandgaps and versatile magnetic behaviors (Phys. Rev. Lett. **107**, 135501 (2011)). First-principles theory was used to highlight the microscopic origin of the emerging electronic and magnetic properties of the main subclasses of GNWs, thereby establishing a road-map for guiding the design and synthesis of specific GNWs with targeted nanoelectronic, optoelectronic, and spintronic properties. We will show the unusual versatility of GNWs' magnetic properties, we will highlight the variation of electronic properties with the details of the structures and how these structures can be used to transport electrons.

Vincent Meunier
Rensselaer Polytechnic Insitute

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