Abstract Submitted
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Pentacene pinwheels: chiral heterostructures between C_{60} and pentacene[1] JEFFREY R. GUEST, JOSEPH A. SMERDON, OZGUN SUZER, NATHAN P. GUISINGER, Center for Nanoscale Materials, Argonne National Laboratory — Pentacene and C_{60} are archetypal molecules for optically active acceptor-donor molecular heterojunctions and for the study of self-assembly on surfaces. Using UHV STM, we demonstrate that these molecules - despite their high degree of symmetry - can self-assemble into *chiral* heterostructures when C_{60} is deposited on a 'random-tiling' [1] of pentacene (Pn) on Cu(111). Two different chiral heterostructures with a central C_{60} surrounded by 6 Pns in a 'pinwheel' formation are identified: one with interlocking Pns of mixed chirality and one with shared Pns of the same chirality. The latter is observed in single chirality domains that include hundreds of pinwheels. These complex structures are solved unambiguously through the analysis of the STM images and an understanding of Pn adsorption on Cu(111) [2]. Chiral light-absorbing acceptor-donor heterojunctions may provide a powerful platform for detecting and manipulating charge, spin, and optical polarization; we will discuss the electronic properties of these structures, and the prospect for studying the interaction of these types of systems with light using our laser-STM approach.

[1] J. A. Smerdon et al., Phys. Rev. B **84**, 165436 (2011).
[2] J. Lagoute et al, Phys. Rev. B **70**, 245415 (2004).

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