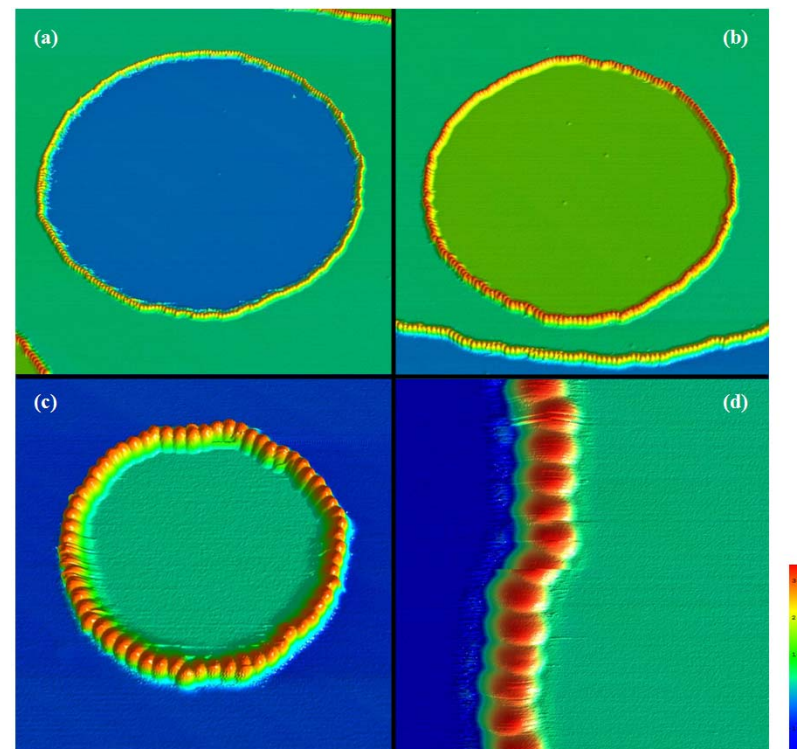
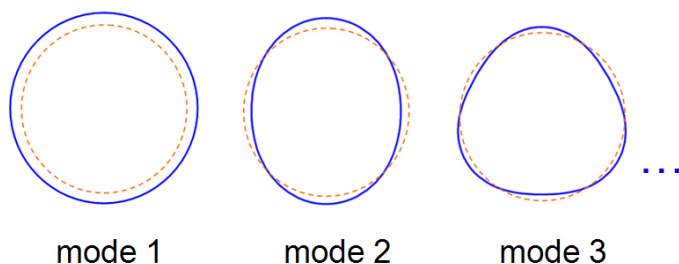


University of Maryland NSF-MRSEC Highlight: Molecular Nano-Ring Beats Like a Chime

Chenggang Tao, T. Stasevich, W.G. Cullen, T.L. Einstein and E.D. Williams
Nano Lett. doi:10.1021/nl070210a (2007)

Perfect rings of C60 molecules, lined up around circular layers of silver, reveal an important property of nanoelectronic contacts: thermal energy causes the structures to fluctuate. The movement of the molecules in the rings is captured by making repeated (“time-lapse”) STM images. The results show that the ring vibrates like a mechanical object, with well-defined shape changes known as “modes.” Such metal-molecule interface vibrations will create unique electrical signatures in nanoelectronic devices.



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Molecular Nano-Rings

Top right: False color images, measured using scanning tunneling microscopy (STM), of C60 molecules arranged around the inside edge of a circular “hole” of Ag, and around a circular plateau. Individual C60 molecules are easily seen in the smaller ring at lower left, and in the zoom-in image of a segment of the edge of the ring.

Above left: Illustration of the vibration modes that distort a mechanical ring, for instance a musical chime, when it vibrates to create a musical tone. Time resolved images of the molecular ring reveal the same types of modes,