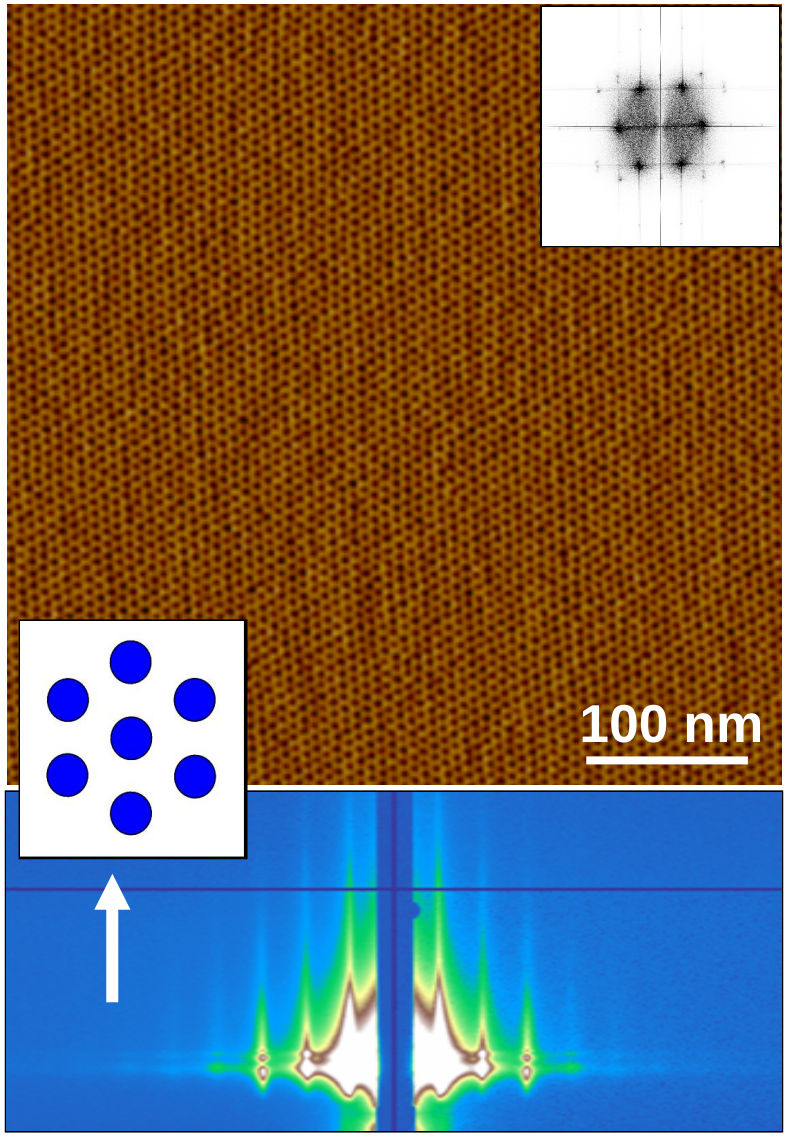
Macroscopic 10 Terabit/in^2 Arrays from Block Copolymers

A collaboration between UMass and UC Berkeley researchers funded by the NSF and DOE has led to a breakthrough in the areal density of templates derived from block copolymers (BCPs) having orientational registry over macroscopic distances. The facets on a reconstructed single crystal surface were used to guide and direct the self-assembly of BCPs having 3 nm cylindrical domains over arbitrarily large surfaces. Grazing incidence x-ray scattering (GISAXS) quantitatively demonstrated the perfection in the orientational order and the quasi-crystalline long-range lateral order of the arrays. The unprecedented small size of the domains could revolutionize bit patterned storage media and yield capacities over 10.5 Tbit/in.^{2}

Professors Thomas Russell, UMass and Ting Xu, Berkeley



Atomic force micrograph of a BCP array with the corresponding a schematic and Fourier transform in the insets reflect the lateral order. GISAXS at bottom provides a nanoscopic to macroscopic metric.

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