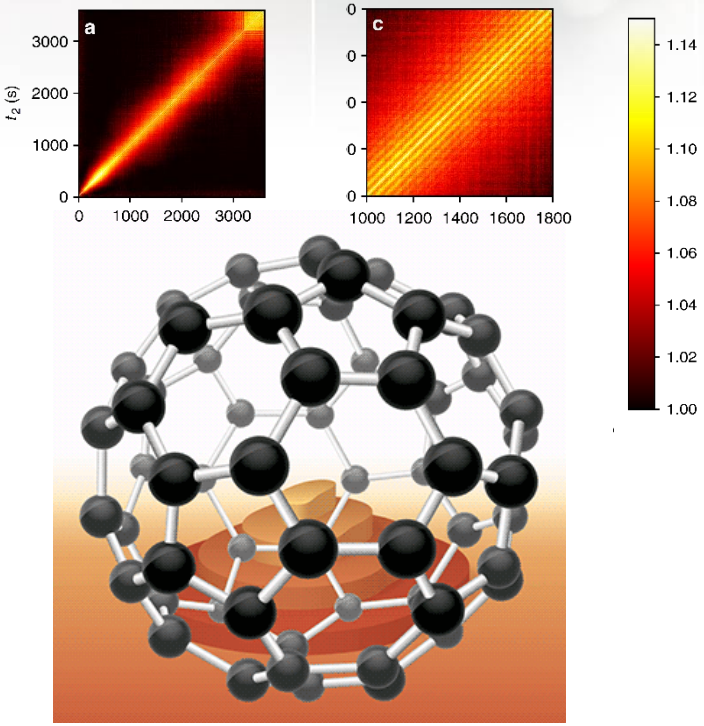
Creating 'Speckle Pattern' Movies of Thin Film Growth



This animation is a simplified representation of thin film growth. As C_{60} molecules are deposited onto a material, they form multiple layers simultaneously — not one layer at a time.

R. L. Headrick, J. G. Ulbrandt, P. Myint, J. Wan, Y. Li, A. Fluerasu, Y. Zhang, L. Wiegart, K. F. Ludwig Jr., *Nat. Comms.* **10**:2638, 1-9 (2019).

Work was partly performed at Brookhaven National Laboratory

Scientific Achievement

Scientists demonstrated a new experimental capability for watching thin film growth in real-time that depicts the process more accurately than traditional techniques.

Significance and Impact

The result of this study could be used to improve organic solar cells, and to improve future research on other types of thin films for a wide variety of applications.

Research Details

- The study showed that C_{60} molecules deposit in multiple layers simultaneously – not one layer at a time.
- The molecules migrate by surface diffusion towards the step-edge boundary of an existing layer.
- The step-edges grow in a self-similar or autocorrelating pattern, which can be observed using coherent x-rays.
- Measurements for this study used x-ray photon correlation spectroscopy at NSLS-II CHX beamline.