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Importing super-resolution imaging into nanoscale puzzles of materials dynamics JOHN KING, CHI HANG BOYCE TSANG, WILLIAM WILSON, STEVE GRANICK, Univ of Illinois - Urbana — A limitation of the exciting recent advances in sub-diffraction microscopy is that they focus on imaging rather than dynamical changes. We are engaged in extending this technique beyond the usual biological applications to address materials problems instead. To this end, we employ stimulated emission depletion (STED) microscopy, which relies on selectively turning off fluorescence emitters through stimulated emission, allowing only a small subset of emitters to be detected, such that the excitation spot size can be downsized to tens of nanometers. By coupling the STED excitation scheme to fluorescence correlation spectroscopy (FCS), diffusive processes are studied with nanoscale resolution. Here, we demonstrate the benefits of such experimental capabilities in a diverse range of complex systems, ranging from the diffusion of nano-objects in crowded 3D environments to the study of polymer diffusion on 2D surfaces.

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