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PROBING THE INITIAL STAGES OF PLASTICITY WITH NANOINDENTATION

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The probed volumes in nanoindentation can be comparable to the characteristic length scales of some of the defect configurations that control early-stage plastic deformation in metals. Representative examples from work carried out with my collaborators will be reviewed with a view to shedding light on the elementary processes associated with the transition from elastic to plastic deformation. Among the topics to be discussed are: homogeneous versus heterogeneous dislocation nucleation, nucleation versus activation of pre-existing dislocations, effects of source density, pinning by interstitial elements, and influence of crystal structure.