

Abstract Submitted
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Transient core structural dynamics at the solid-to-plasma transition of the cluster¹ YOSHIAKI KUMAGAI, Argonne Natl Lab, AKINOBU NIOUZU, Kyoto University, PHAY HO, Argonne Natl Lab, TOSHIYUKI NISHIYAMA, NAOMICHI YOKONO, Kyoto University, HIRONOBU FUKUZAWA, TSUKASA TAKANASHI, DAEHYUN YOU, TAISHI ONO, Tohoku University, SHIGEKI OWADA, RIKEN SPring-8 Center, ICHIRO INOUE, AKIRA KON, KENSUKE TONO, JASRI, MAKINA YABASHI, RIKEN SPring-8 Center, LINDA YOUNG, Argonne Natl Lab, KIYOSHI UEDA, Tohoku University, KIYONOBU NAGAYA, Kyoto University, CHRISTOPH BOSTEDT, Argonne Natl Lab — We have conducted an x-ray/x-ray pump/probe experiment to study transient nuclear dynamics upon strong electronic excitation in nanoclusters with Angstrom resolution. We employed two-color hard x-ray scattering with well separated energies and well characterized arrival-times at the SACLA free-electron laser. The first x-ray pulse is used to characterize the size and orientation of the van-der-Waals nanocrystals as well as to induce the x-ray ionization and expansion processes in a nanoparticle. The second pulse is used to probe the nuclear dynamics following the strong ionization. Using the exact same Bragg reflection from two different color x-ray pulses yields unprecedented information about the nanoparticle lattice response upon ionization, not accessible in previous experiments [K. Ferguson et al, *Sci. Adv.* 2, 1500837 (2016)].

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