

## Supplemental Material

### Compressive effects in melting of Palladium thin films studied by ultrafast x-ray diffraction

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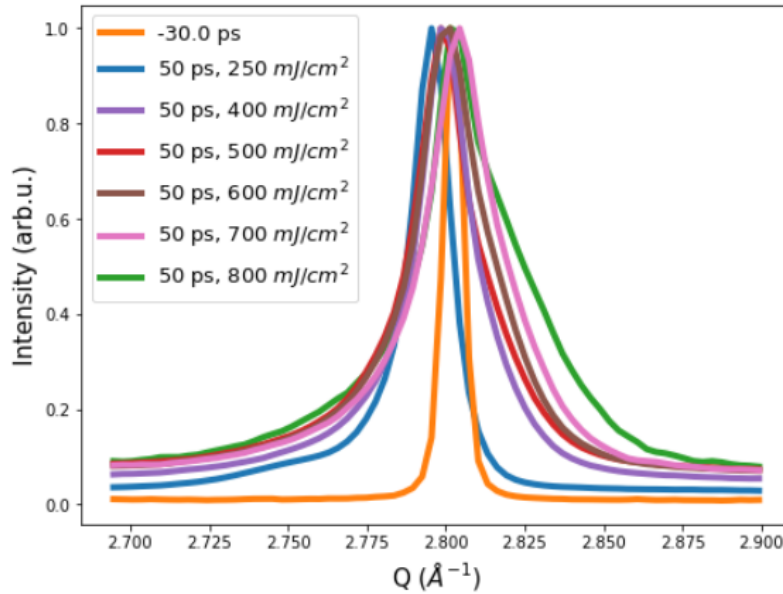


FIG. S1. (111) Bragg peak for negative time delays (-30 ps) and positive 50 ps for different fluences. The intensity is normalized with respect to the maximum intensity.

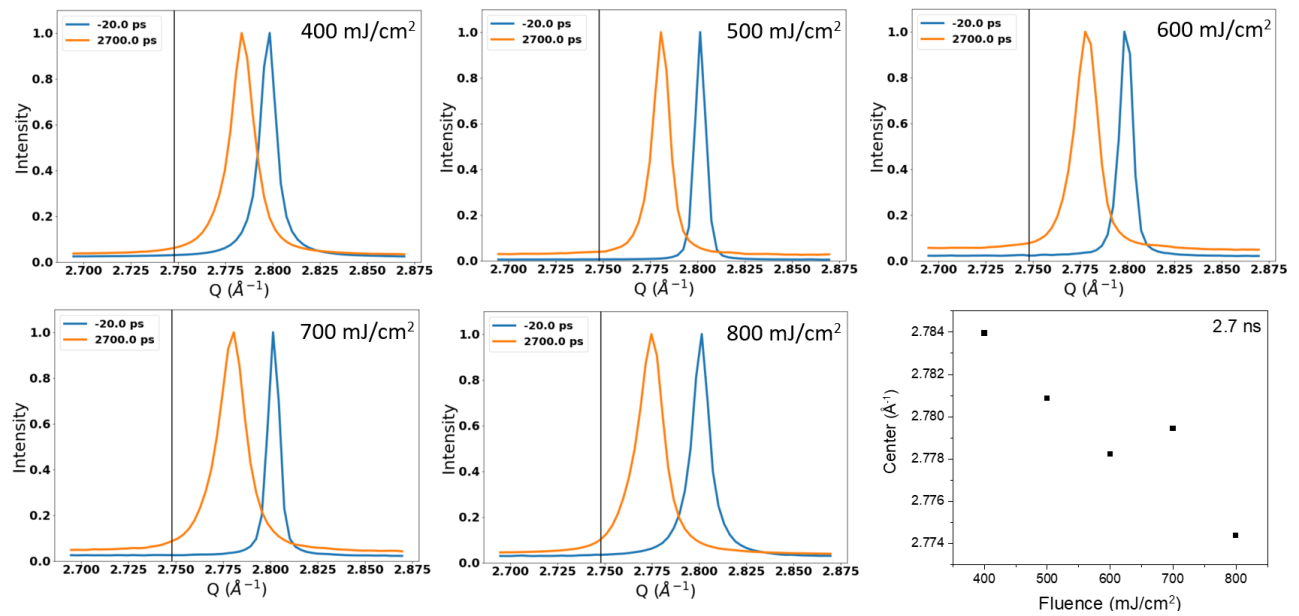


FIG. S2. Plot showing the XRD intensity versus momentum transfer,  $Q$ , for the (111) reflection before the laser shines on the sample ( $t = -20$  ps), and after, for the longest time delay investigated in our experiment ( $t = 2.7$  ns) for fluences ranging in the interval 400-800  $\text{mJ}/\text{cm}^2$ . The black line in the plots represents the  $Q$  value for Pd crystalline structure at the melting temperature (1828 K). The last plot (bottom, right) shows the center of the peak after 2.7 ns versus fluence.

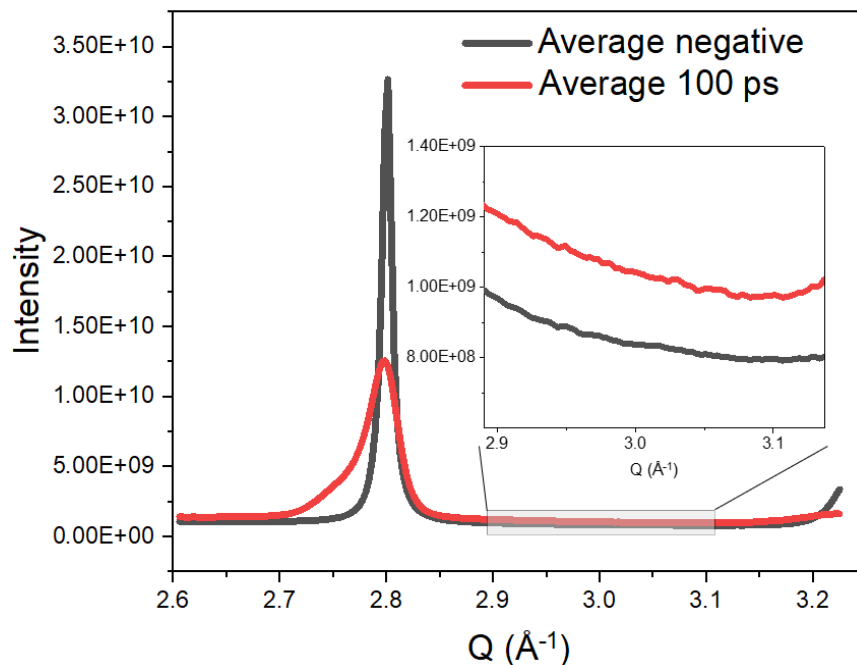


FIG. S3. 1D diffraction plots for the average of the negative and 100 ps time delays for  $800 \text{ mJ/cm}^2$ . The background region corresponding to the liquid part of the structure is higher for positive time delays, as shown in the inset.

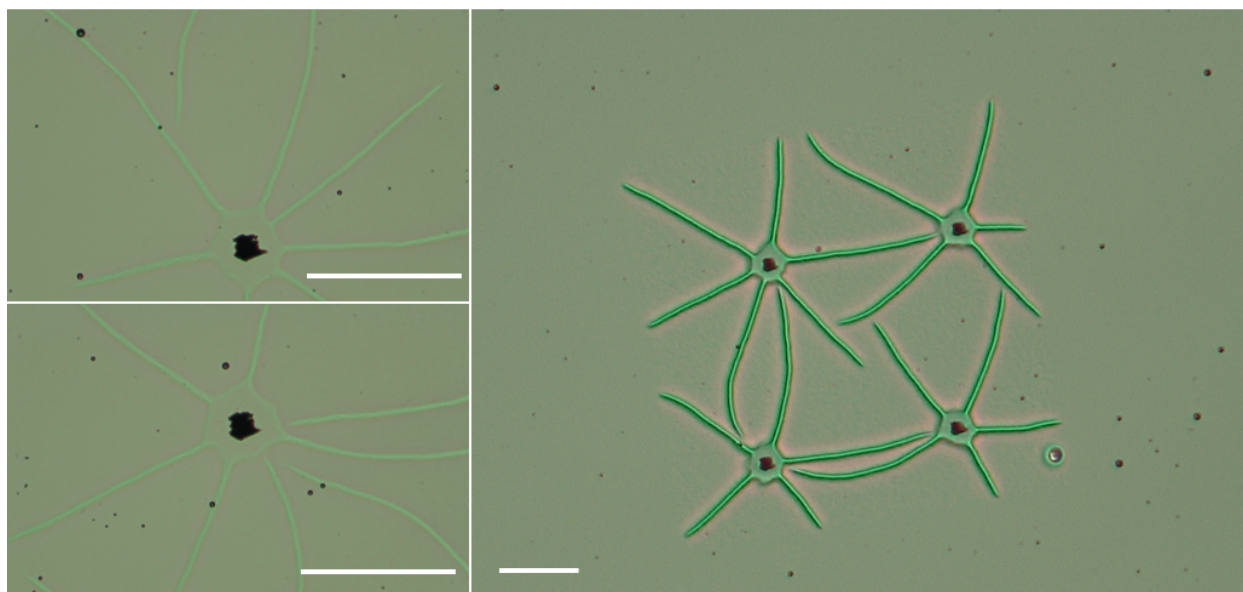


FIG. S4. Optical microscopy images of the sample after the experiment took place. The scale bar represents  $100 \text{ }\mu\text{m}$  for all the images. The central black mark is where the x-ray reaches the sample, and the debris around can be due to the ablation of the sample.