



**Extended Data Fig. 3. | Two-temperature model calculations of electron and lattice temperature dynamics following femtosecond laser excitation. a,** Temporal evolution of electron temperature (dashed lines) and lattice temperature (solid lines) calculated using the two-temperature model for pump fluences of 25 mJ/cm<sup>2</sup> (blue), 50 mJ/cm<sup>2</sup> (orange), and 100 mJ/cm<sup>2</sup> (red). The horizontal black dashed line indicates the melting temperature of Cu (1358 K). At the threshold fluence of 45.4 mJ/cm<sup>2</sup>, the lattice temperature reaches the melting point. Accordingly, fluences of 50 and 100 mJ/cm<sup>2</sup> result in lattice heating above this threshold, whereas 25 mJ/cm<sup>2</sup> remains below it. **b,** Lattice temperature as a function of pump fluence evaluated at a delay time of 20 ps, by which point the lattice temperature has reached its maximum value across the full fluence range examined. The horizontal red dashed line indicates the melting temperature of Cu (1358 K). The threshold fluence at which the lattice temperature reaches the melting point is determined to be 45.4 mJ/cm<sup>2</sup>, as shown with the vertical red dashed line.