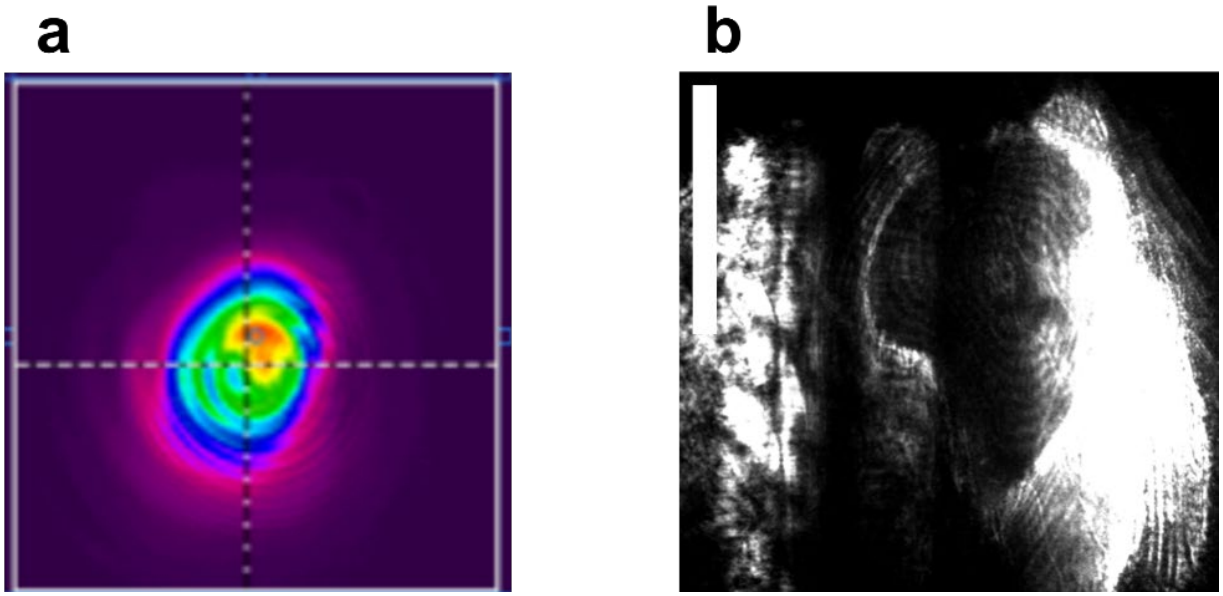


**Extended Data Fig. 7. | The spatial distribution of the interference fringes follows the incident laser beam profile. a**, Independent measurement of the femtosecond pump laser beam profile recorded by a CCD-based laser beam profiler. **b**, Single-shot DFXM image of the Cu(111) thin film (TTBD = 0.039 $\mu m^{-1}$) acquired at a pump–probe delay of 100 ps under the same laser conditions. The envelope of the interference fringe pattern reproduces the elliptical footprint of the pump laser profile in **a**, confirming that the picosecond near-surface disordering is confined to the photoexcited region. Scale bar, 50 μm.