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**Multi-probe mapping of optimally doped  $\text{BaFe}_2(\text{As}_{1-x}\text{P}_x)_2$**  ERIC THEWALT, JAMES HINTON, IAN HAYES, ARIELLE LITTLE, SHREYAS PATANKAR, LIANG WU, University of California, Berkeley and Lawrence Berkeley National Laboratory, TONI HELM, Max Planck Institute for Chemical Physics of Solids, NOBUMICHI TAMURA, Lawrence Berkeley National Laboratory, DUNG-HAI LEE, JAMES ANALYTIS, JOSEPH ORENSTEIN, University of California, Berkeley and Lawrence Berkeley National Laboratory — The superconductor  $\text{BaFe}_2(\text{As}_{1-x}\text{P}_x)_2$  has a rich phase diagram. Much like in the cuprates, the parent compound has an antiferromagnetic phase that yields to superconductivity with doping. Evidence for a variety of nematic phenomena, including a nematic phase transition extending above the superconducting dome and a nematic quantum critical point at optimal doping, has emerged. We have studied an optimally doped sample using scanning X-ray microdiffraction and pump-probe birefringence microscopy. Combining these techniques allows us to image built-in strain and its dynamical effects locally, and we report correlations between local strain and ultrafast dynamics.

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