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**Angular fluctuations of a multi-component order describe the pseudogap regime of the cuprate superconductors<sup>1</sup>**

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The hole-doped cuprate high temperature superconductors enter the pseudogap regime as their superconducting critical temperature,  $T_c$ , falls with decreasing hole density. Experiments have probed this regime for over two decades, but we argue that decisive new information has emerged from recent X-ray scattering experiments. The experiments observe incommensurate charge density wave fluctuations whose strength rises gradually over a wide temperature range above  $T_c$ , but then decreases as the temperature is lowered below  $T_c$ . We propose a theory in which the superconducting and charge-density wave orders exhibit angular fluctuations in a 6-dimensional space. The theory provides a natural quantitative fit to the X-ray data, and is consistent with other observed characteristics of the pseudogap. Results will also be presented on the microscopic origins of these order parameters.

<sup>1</sup>Work in collaboration with Lauren Hayward, Roger Melko, David Hawthorn, and Jay Sau