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Infrared probe of the pseudogap in the BaFe₂As₂ high- T_c superconductors

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The nature of the pseudogap of high- T_c cuprate superconductors is one of the most significant problems in condensed matter physics. The central issue concerns whether the pseudogap is associated with the precursor superconductivity or other broken symmetry state. Regardless of the origin, the pseudogap is considered as an essential part of physics of unconventional cuprate superconductors. There is mounting evidence that the superconductivity of the Fe-based materials is also quite exotic. However, the spectroscopic manifestations of the pseudogap in the Fe-based superconductors remained elusive. We present the *ab*-plane and *c*-axis infrared data of the prototypical pnictide system: the BaFe₂As₂ family. Our experiments have identified the hallmarks of the pseudogap that mirror the manifestations of the pseudogap in the underdoped cuprates. The evolution of the charge dynamics across the phase diagram suggests that the pseudogap is not directly related to precursor superconductivity but may be linked to antiferromagnetism.