Pressure-Driven Quantum Criticality in An Iron-Selenide Superconductor

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The discovery of superconductivity of about 30K in iron selenides with very large magnetic moments simulates the examination of completing orders. Here we report a finding of pressure induced suppression of the superconducting transition temperature Tc and enhancement of the temperature of the resistance hump T_H through charge transfer between two iron sites with different occupancies. The activation energy for the electric transport of the high temperature resistance is observed to go to zero at a critical pressure of 8.7GPa, at which superconductivity tends to disappear and the semiconductor to metal transition takes place. Beyond the critical point, the resistance exhibits a metallic behavior over the whole temperature range studied. All these features indicate the existence of quantum criticality in iron selenide superconductors.

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