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The gap structure and temperature-pressure phase diagram of FeS superconductor TIANPING YING, JUN ZHANG, FENGLIANG LIU, Fudan Univ, XIAOFANG LAI, Peking Univ, XIAOCHEN HONG, Fudan Univ, WENGE YANG, Center for High Pressure Science and Technology Advanced Research (HPSTAR), FUQIANG HUANG, Peking Univ, SHIYAN LI, Fudan Univ — We report low-temperature heat transport measurements on both single crystal and foil of iron sulfide FeS ($T_c \approx 4.5$ K), a sulfide counterpart of FeSe. In zero magnetic field, a significant residual linear term κ_0/T is observed. At low field, κ_0/T increases rapidly with the increase of field. These results suggest a nodal superconducting gap in FeS. The origin of this nodal superconductivity in FeS is discussed, by comparing with other iron-based superconductors with nodal gap. Further, we perform high-pressure measurements on the FeS single crystals. A rapid suppression of T_c and vanishing of superconductivity at 4.0 GPa are observed, followed by a second superconducting dome from 5.0 to 22.3 GPa with a 30% enhancement in maximum T_c. An onsite tetragonal to hexagonal phase transition occurs around 7.0 GPa, followed by a broad pressure range of phase coexistence. The residual deformed tetragonal phase is considered as the source of second superconducting dome. The observation of two superconducting domes in iron-based superconductors poses great challenges for understanding their pairing mechanism. **Reference Phys. Rev. B 94, 100504(R) (2016). arXiv:1604.05254.**

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