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Features of Superconducting Gaps Revealed by STM/STS in Iron Based Superconductors With and Without Hole Pockets[1] HAI-HU WEN, Nanjing University, HAI-HU WEN TEAM — The pairing mechanism and gap structure in iron based superconductors (IBS) remains unresolved. We have conducted extensive STM/STS study on the $Na(Fe_{1-x}T_x)As$ (T=Co, Cu, Mn)[1], $Ba_{1-x}K_xFe_2As_2$[2], KFe_2As_2[3], and $Li_{1-x}Fe_xOHFeSe$[4] single crystals. We found the clear evidence of the in-gap quasi-particle states induced by the non-magnetic Cu impurities in $Na(Fe_{0.97-x}Co_{0.03}Cu_x)As$, giving strong evidence of the $S^{\pm}$ pairing. Furthermore, we show the presence of the bosonic mode with the energy identical to that of the neutron resonance and a simple linear relation $\Omega/k_BT_c \approx 4.3$, being explained a consequence of the Spairing. The STS spectrum in $Li_{1-x}Fe_xOHFeSe$ clearly indicates the presence of double superconducting gaps with $\Delta_1 \approx 14.3$ meV and $\Delta_2 \approx 8.6$ meV. Further analysis based on QPI allows us to assign the larger (smaller) gap to the outer (inner) hybridized electron pockets[4]. The huge value $2\Delta_1/k_BT_c = 8.7$ discovered here undoubtedly proves the strong coupling mechanism. [1] H. Yang et al., Nature Communications **4**, 2947 (2013). [2] Z. Y. Wang, et al., Nature Physics **9**, 42(2013). [3] D. L. Fang, X. Shi et al., arXiv: Condmat.1412.0945. Phys. Rev. B 2015. [4] Z. Y. Du et al., arXiv: Condmat. 1506.04645.

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