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**Impurity-induced bound states in Iron Pnictides with  $s_{\pm}$  pairing symmetry** WEI-FENG TSAI, YAN-YANG ZHANG, CHEN FANG, JIANGPING HU, Purdue University — Using both the Bogoliubov-de Gennes and  $T$ -matrix approaches, we study the in-gap bound states induced by a single impurity in FeAs superconductors, with emphasis of the signatures associated with the sign-changed s-wave pairing symmetry. For a non-magnetic impurity, we find that there are two in-gap bound states, symmetric with respect to zero energy, only in the sign-changed s-wave pairing state, not in the sign-unchanged case, while for a magnetic impurity, we find that there exist only bound state solutions carrying one of the spin polarizations around the impurity. As increasing the scattering strength, the system undergoes a quantum phase transition from a spin-unpolarized ground state to a spin-polarized one. Although the results for the magnetic impurity are qualitatively similar in both the sign-changed and sign-unchanged s-wave pairing states, the bound states in the former case are more robust and there is no  $\pi$  phase shift of the SC gap near the impurity in the strong scattering regime. The model dependence of our results is also discussed.

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