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Phase diagram of $\mathbf{BaFe_2(As_{1-x}P_x)_2}$ DING HU, SHILIANG LI, HUIQIAN LUO, Chinese Academy of Sci (CAS), PENGCHENG DAI, Chinese Academy of Sci (CAS):Rice University — As a unique system of high temperature Iron-based superconductors, recent experimental results indicate that there is a quantum critical point (QCP) around the optimal level in $BaFe_2(As_{1-x}P_x)_2$. We use neutron diffraction, high resolution X-ray scattering and NMR techniques to map out the detailed phase diagram. It is found that the long-range antiferromagnetic (AF) order survives up to the optimal doping level within the instrument resolution. Our results suggest that the evolution of the AF order upon doping in $BaFe_2(As_{1-x}P_x)_2$ is different from that in the electron-doped $Ba(Fe_{1-x}Co_x)_2As_2$ or $Ba(Fe_{1-x}Ni_x)_2As_2$.

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