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Recent Experimental Results of Iron-based Superconductor

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Since the discovery of superconductivity in the high-T_c cuprate, it has been established that the CuO_2 plane is essential for superconductivity. A T_c higher than 40 K has been obtained only in the cuprate superconductor. The highest reported value for non-cuprate is 39 K observed in MgB_2. Recently, the reports of superconductivity in $LnO_{1-x}F_xFeAs$ (Ln = lanthanide: La, Sm, Ce, Nd, Pr, and Gd) have attracted enormous attentions because these materials are the first non-copper oxide superconductors with T_cs exceeding 50 K. These compounds have a tetragonal structure consisting of alternating layers of quasi-two-dimensional puckered LnO and FeAs planes along the c-axis. By replacing O with F in the non-superconducting parent compound of LnOFeAs, the FeAs layers can be doped with electrons. These compounds result in the superconductor at a doping level of $x \approx 0.15 \sim 0.2$ in $LnO_{1-x}F_xFeAs$. After discovering this superconductor, many research groups have reported on theoretical calculations and experimental results for fabrications of poly-crystals and single crystals, and investigations of physical properties to understand this superconductor. In this presentation, I will introduce the recent experimental results of Iron-based superconductors and discuss about future work.

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