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NMR measurements of $LaPt_4Ge_{12}$ and $CePt_4Ge_{12}$

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Recently, Gumeniuk *et al.* have succeeded to synthesize Ge-based filled skutterudites $R\mathrm{Pt_4Ge_{12}}$ (R = La, Ce, Pr, Nd, Eu)[1], and found the superconductivity in $\mathrm{LaPt_4Ge_{12}}$ and $\mathrm{PrPt_4Ge_{12}}$. They have also reported that $\mathrm{CePt_4Ge_{12}}$ shows fluctuating valence. In this presentation, we report on the results of the nuclear magnetic resonance (NMR) measurements for $\mathrm{LaPt_4Ge_{12}}$ and $\mathrm{CePt_4Ge_{12}}$ to deepen the understanding of electronic states at low temperatures.

Figure 1 shows the temperature dependencies of $1/T_1$ for ^{195}Pt and ^{139}La in $\mathrm{LaPt_4Ge_{12}}$. $1/T_1$'s are practically linear in temperature above T_C in a temperature range below 30 K. Above 30 K, $1/T_1$'s deviate from the linear temperature dependence, and obey the following relation $1/T_1T = C/\sqrt{T+\theta}$, suggesting to be dominated by the AFM fluctuations. Below T_C, on the other hand, $1/T_1$ exhibits no coherence peak under the external magnetic field. Inset displays the Arrhenius plot of $T_1/T_{1\mathrm{N}}$ vs T_C/T, where $T_{1\mathrm{N}}$ is the value of T_1 at T_C. One observes that $\ln(T_1/T_{1\mathrm{N}})$ is proportional to T_C/T, that is, an exponential decrease upon cooling $(T_1/T_{1\mathrm{N}}) \propto \exp[\Delta(0)/k_\mathrm{B}T]$ below T_C. From the slope of the Arrhenius plot, we obtain $\Delta(0)/k_\mathrm{B}T_\mathrm{C} = 1.62$, close to the value of the conventional BCS theory in the weak coupling limit $\Delta(0)/k_\mathrm{B}T_\mathrm{C} = 1.76$. This result is interpreted as an evidence for a conventional s-wave pairing.

More detailed results and analyses including for $\mathrm{CePt_4Ge_{12}}$ will be presented at the meeting.

[1] R. Gumeniuk *et al.* : Phys. Rev. Lett. **100** (2008) 017002.

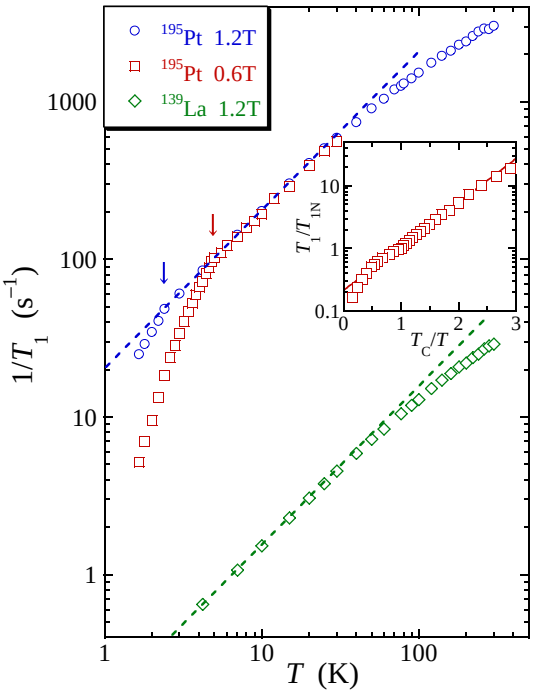

Figure 1: T-dependencies of $1/T_1$ of ^{195}Pt and ^{139}La in $\mathrm{LaPt_4Ge_{12}}$. Arrows indicate T_C's under respective external magnetic fields. Inset displays the Arrhenius plot of $T_1/T_{1\mathrm{N}}$ vs T_C/T.