de Haas-van Alphen effect in $CeCoIn_5$ and $CeRhIn_5$ under pressure

<u>H. Shishido</u>[1], R. Settai[1], T. Kubo[1], S. Hashimoto[1], T. Ueda[1], H. Harima[2] and Y. Ōnuki[1]

1 - Department of Physics, Graduate School of Science, Osaka University,
    Toyonaka, Osaka, 560-0043, Japan
2 - The Institute of Scientific and Industrial Research, Osaka University,
    Ibaraki, Osaka 567-0047, Japan

We have studied de Haas-van Alphen (dHvA) effect under pressure for a pressure-induced superconductor $CeRhIn_5$ and a heavy Fermion superconductor $CeCoIn_5$. These Fermi surfaces are cylindrical. The Fermi surface of $CeRhIn_5$ is almost the same as that of $LaRhIn_5$ at ambient pressure [1]. On the other hand, the $4f$ electron is itinerant in $CeCoIn_5$[2].

The Fermi surfaces in $CeRhIn_5$ and $CeCoIn_5$ are found to be unchanged up to $2.1\,GPa$ and $3.1\,GPa$, respectively. The cyclotron effective mass of $CeRhIn_5$,however, increases with increasing pressure. For example, the cyclotron mass of branch β_2 ($m_c^* = 5.7\,m_0$ at ambient pressure) reaches $40\,m_0$ at $2\,GPa$, as shown in Fig. 1 (a)[3]. On the other hand, the cyclotron mass in $CeCoIn_5$, decreases with increasing pressure. The cyclotron mass of branch β_2 ($58m_0$ at ambient pressure) decreases down to $38\,m_0$ at 3GPa, as shown in Fig. 1 (a)[4].
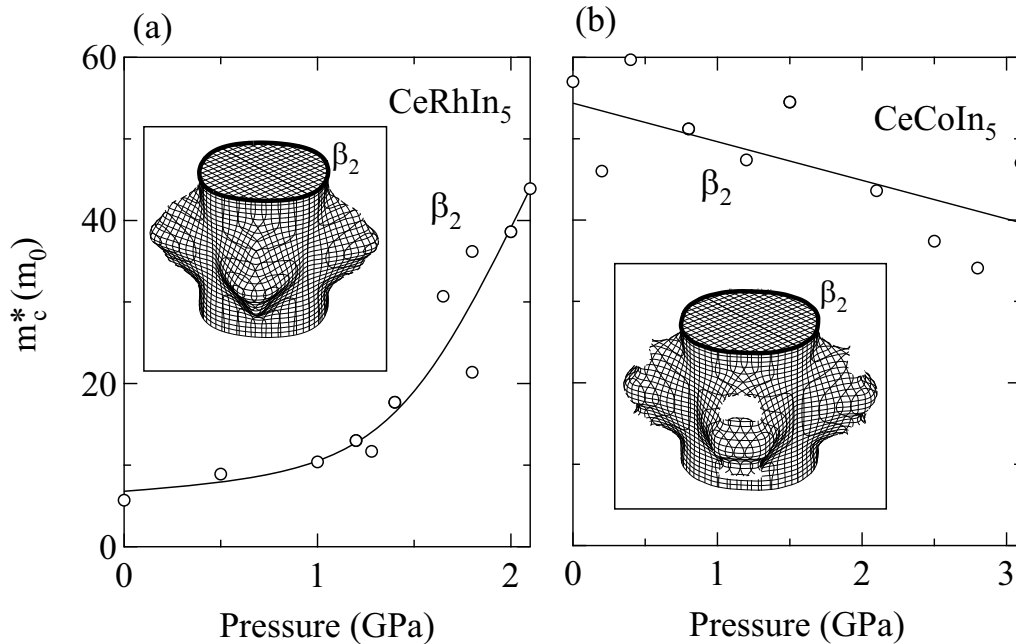

Figure 1: Pressure dependence of the cycltron mass of barnch β_2 in (a) $CeRhIn_5$ and (b) $CeCoIn_5$.The inset shows the Fermi surface corresponding branch β_2.

[1] H. Shishido, R. Settai, D. Aoki, S. Ikeda, H. Nakawaki, T. Iizuka, Y. Inada, K. Sugiyama, T. Takeuchi, K. Kindo, T. C. Kobayashi, Y. Haga, H. Harima, Y. Aoki, T. Namiki, H. Sato and Y. Ōnuki: J. Phys. Soc. Jpn **71**, 162 (2002).
[2] R. Settai, H. Shishido, S. Ikeda, Y. Murakawa, M. Nakashima, D. Aoki, Y. Haga, H. Harima and Y. Ōnuki: J. Phys.: Condens. Matter **13**, L627 (2001).
[3] H. Shishido, T. Ueda, S. Hashimoto, T. Kubo, R. Settai, H. Harima and Y. Ōnuki: J. Phys.:Condens. Matter **15** L499 (2003).
[4] H. Shishido, R. Settai, S. Araki, T. Ueda, Y. Inada, T. C. Kobayashi, T. Muramatsu, Y. Haga and Y. Onuki: Phys. Rev. B **66** 214510 (2002).