\(^{13}\)C-NMR study of the Dirac-electron systems in the quasi-two-dimensional organic conductor \(\theta-(\text{BEDT-TTF})_2\text{I}_3\) under hydrostatic pressures

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The recent discovery of low energy excitations in graphene with linear energy-momentum relations, known as the Dirac electrons, has stimulated great interests both theoretically and experimentally [refs. 1, 2]. These kinds of novel quasi-particles have also been suggested to be in the organic conductors \(\theta\text{-}(\text{BEDT-TTF})_2\text{I}_3\) (\(\theta\)- and \(\alpha\)-I\(_3\)) under high pressures (above 0.6 and 2.0 GPa, respectively) [refs. 3-5], which have, however, different characteristics from those of graphene because of the strong electronic correlations and the lower lattice symmetry [ref. 3]. \(\theta\)- and \(\alpha\)-I\(_3\) may be novel platforms that afford us a great possibility to understand the electronic properties of Dirac electrons in a distinct and/or profound way owing to the bulky nature of the organic crystals.

Here, we report the electronic properties of \(\theta\)-I\(_3\) under ambient and hydrostatic pressures (> 0.6GPa) revealed with the aid of \(^{13}\)C-NMR. The metallic state at ambient pressure was identified as a usual Fermi liquid state which satisfied Körringa's relation with the NMR enhancement factor \(K_{\alpha}\) of about 2 from 100K down to 5 K. These results suggest that the electronic correlation is weak (Fig. 1). On the day, results under hydrostatic pressures will also be shown and compared with the theoretical predictions [ref. 6].