PS-C5

Effect of Interlayer Spin-flip Tunneling for Interlayer Magnetoresistance in Multilayer Dirac Fermion Systems

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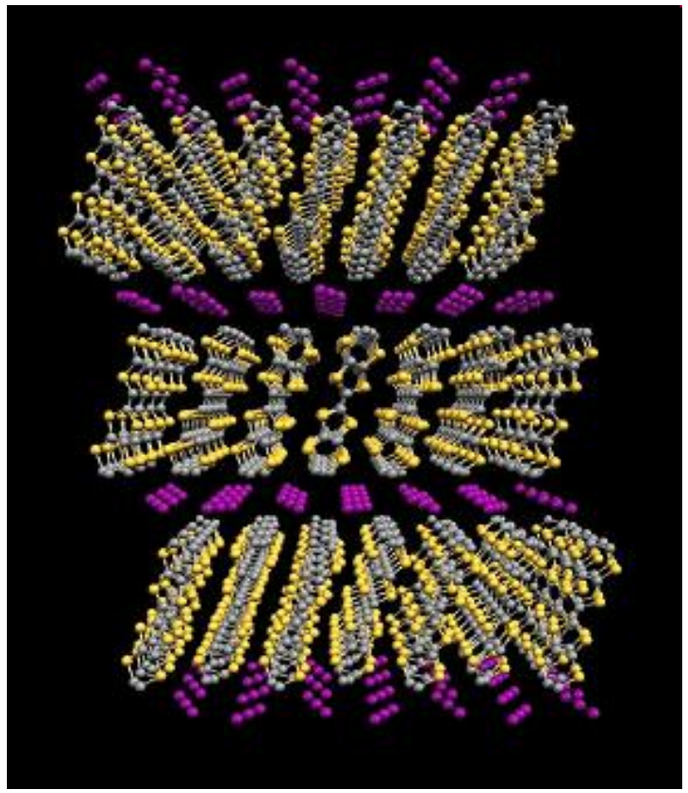
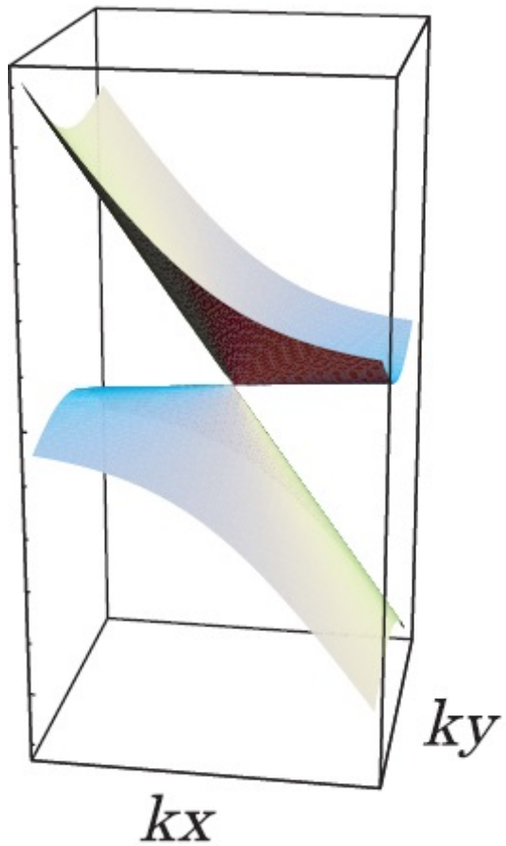
K. Kubo, T. Morinari, J. Phys. Soc. Jpn. **83**, 083701 (2014)

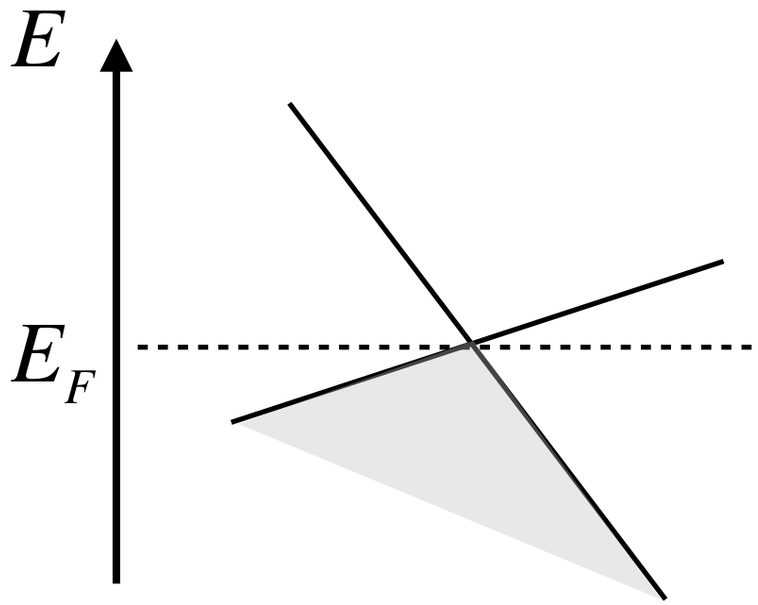
α-(BEDT-TTF)$_2$I$_3$

- Dirac fermion system under high pressure Tajima et al., 2000, 2006
- Multilayered system with conducting layers of BEDT-TTF molecules and insulating layers of I_3 anions.



N. Tajima, (RIKEN)

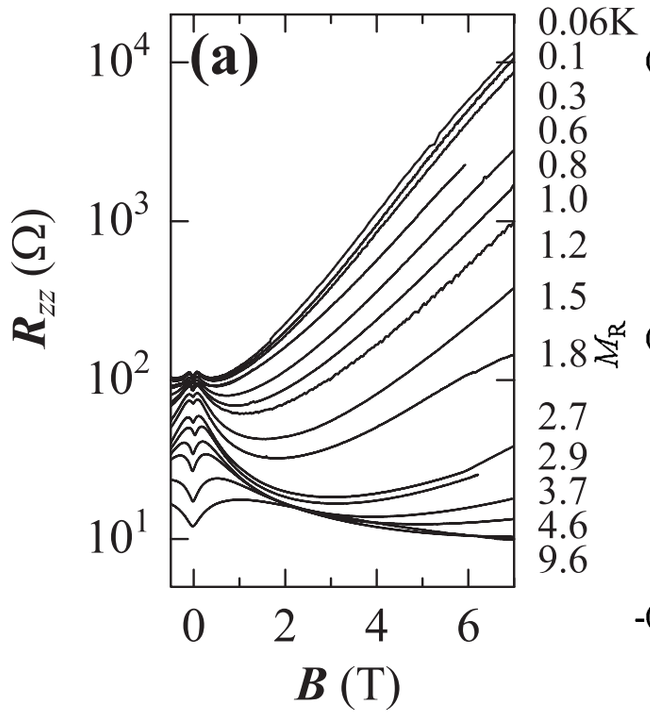




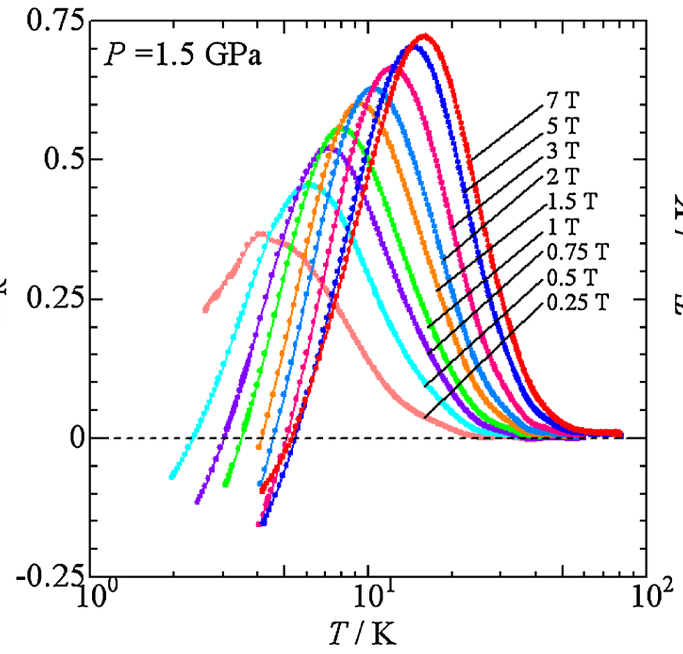
A. Kobayashi et al., (2004)
S. Katayama, A. Kobayashi, Y. Suzumura, (2006)

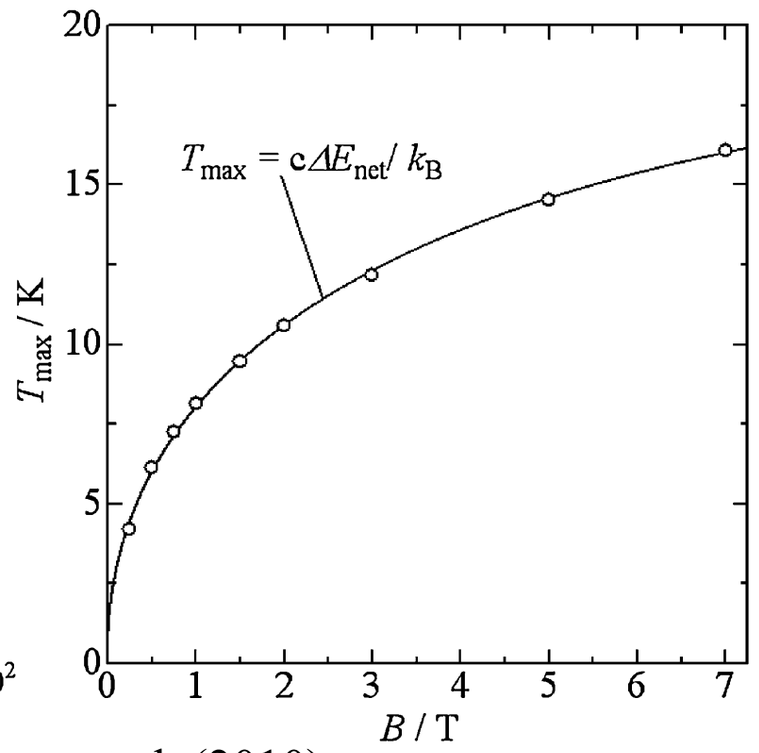
Motivation

- α-(BEDT-TTF)$_2$I$_3$ has unique interlayer magnetoresistance



N. Tajima et al., (2009)





S. Sugawara et al, (2010)

- Previous theoretical research : $T_{\max} = C\sqrt{B}$ T. Morinari and T. Tohyama, (2010)
- Experimental result : $T_{\max} = C\sqrt{B} - g\mu_B B$

  → Peak temperature is shifted by the Zeeman energy.
- <u>The interlayer tunneling should be related to spin-flip processes.</u>

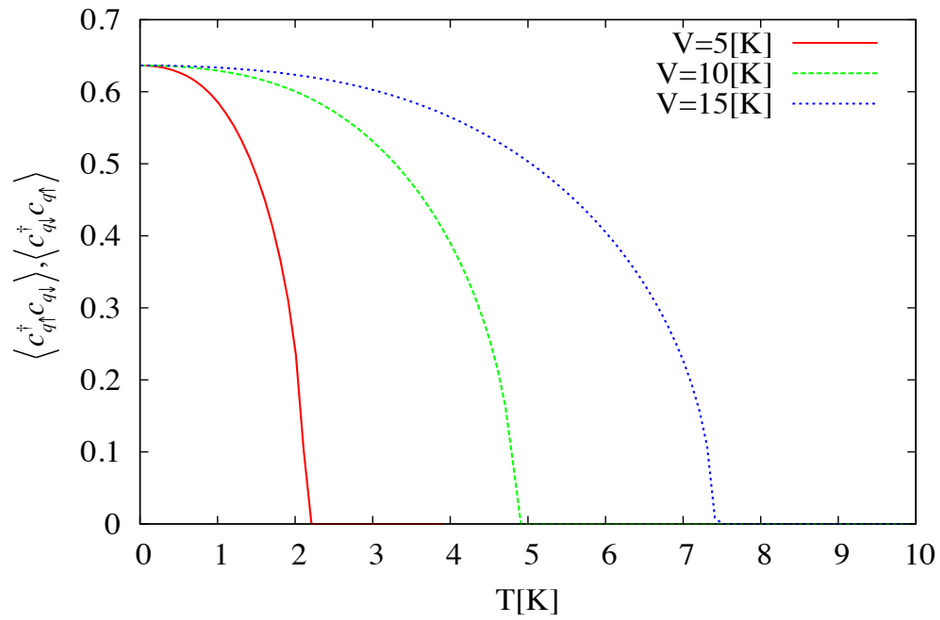
Results

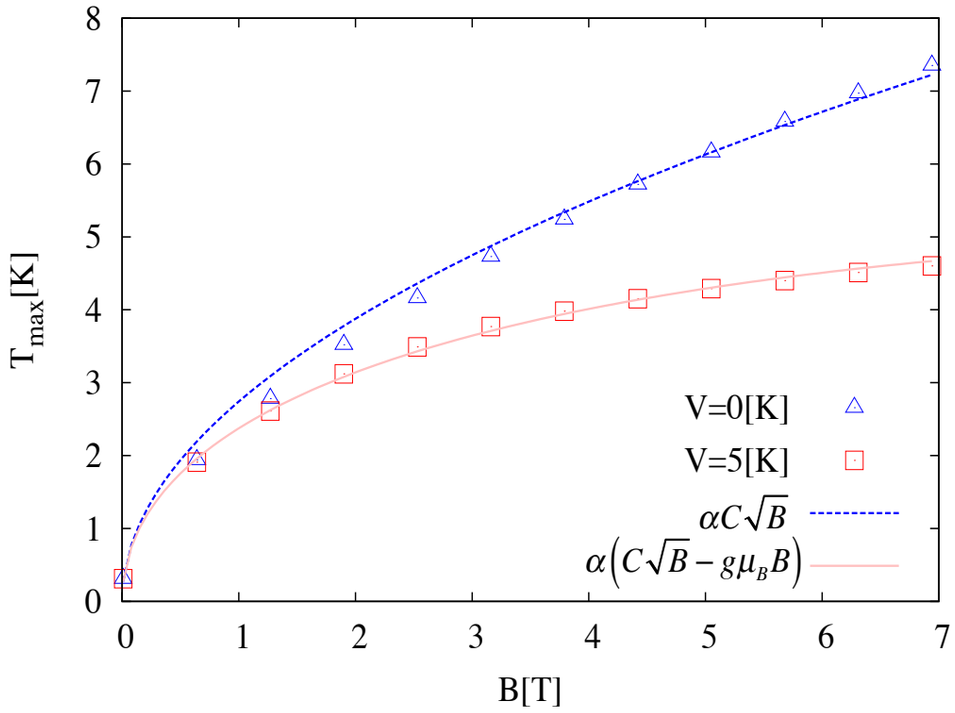
- The opposite spin mean field arise from the interlayer Coulomb interaction

- The opposite spin mean field leads the interlayer spin-flip tunneling

$$\left\langle c^{\dagger}_{l+1\uparrow} c_{l\downarrow} \right\rangle c^{\dagger}_{l\uparrow} c_{l+1\downarrow}$$

- The peak temperature of the interlayer magnetoresistance is shifted by the Zeeman energy.





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