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Scaling study of Kondo effect in a quantum dot embedded in an Aharonov-Bohm interferometer RYOSUKE YOSHII, MIKIO ETO, Faculty of Science and Technology, Keio University — The Kondo effect is theoretically investigated in a quantum dot embedded in an Aharonov-Bohm (AB) ring, using the "poor man's" scaling method. First, we construct an equivalent model in which a quantum dot is coupled to a single lead. The AB interference effect is involved in the magnetic-flux dependence of the density of states in the lead. The scaling analysis of this model yields analytical expressions for the Kondo temperature $T_{\rm K}$ and logarithmic corrections to the conductance at temperatures $T \gg T_{\rm K}$.[1] We find that (i) $T_{\rm K}$ is significantly modulated by the magnetic flux penetrating the ring when the ring size L is much smaller than the size of Kondo cloud, $L_{\rm K} = \hbar v_{\rm F}/T_{\rm K}$, with $v_{\rm F}$ being the Fermi velocity. $T_{\rm K}$ is hardly affected by the flux when $L \gg L_{\rm K}$. (ii) When $L \ll L_{\rm K}$, the flux dependence of $T_{\rm K}$ is the smallest around the center of Coulomb valley and becomes remarkable near the edges of the valley.[2]

[1]R. Yoshii and M. Eto, J. Phys. Soc. Jpn. **77**, 123714 (2008).
[2]R. Yoshii and M. Eto, Physica E, in press.

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