

## Effects of van Hove Singularities on Transport of Quantum Dot Systems in Kondo Regime

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**Abstract:** In the present paper, we study the effect of van Hove singularities of conduction electron on the transport of a single quantum dot system in the Kondo regime. By using both the equation-of-motion and the noncrossing approximation techniques, we show that the corrections caused by these singularities are actually minor. It can be explained by observing that the singularities in the equations, which determine the electronic DOS on the dot, are integrable. Furthermore, we find that, although each line width function is divergent at van Hove singular points, the total divergence is canceled out in the final formula to calculate the current through the system. Therefore, as far as the qualitative properties of the system is concerned, these singularities can be ignored and the wide-band approximation can be safely used in calculation.

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Key words: quantum dot system, van Hove singularities, Kondo effect

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