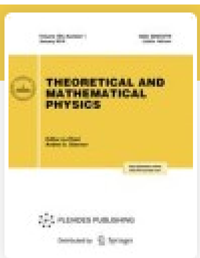

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Diagrammatic theory for the Anderson impurity model: Stationary property of the thermodynamic potential

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Abstract

We propose a diagrammatic theory around the atomic limit for the normal state of the Anderson impurity model. The new diagram method is based on Wick's theorem for conduction electrons and a generalized Wick's theorem for strongly correlated impurity electrons, which coincides with the definition of the Kubo cumulant. We prove a linked-cluster theorem for the mean of the evolution operator and obtain Dysontype equations for the one-particle propagators. The main element in these equations is the impurity electron correlation function, which contains the spin, charge, and pairing fluctuations of the system. We express the system thermodynamic potential in terms of the full propagator of conduction electrons and the correlation function. We establish that the thermodynamic potential is stationary under changes of the correlation function.

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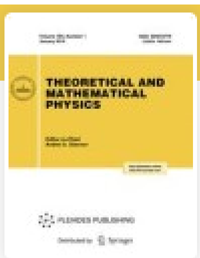

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