

# Three-pole Composite Operator Method for the t-J model

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We analyze the characteristic features and the anomalous behavior of the local and the momentum-dependent properties of the t-J model using a novel three-pole approximation within the Composite Operator Method[1-5]. Accordingly, we choose an operatorial basis made of three composite fields describing the main excitations of the system: (i) the lower Hubbard operator and its dressing by (ii) spin and (iii) charge nearest-neighbor excitations. Within a generalized mean-field and exploiting algebraic constraints, we obtain a set of self-consistent equations for the physical parameters of the system, namely, the nearest and the next-nearest neighbor charge-charge and spin-spin correlations and the kinetic energy. The results are compared to those of well-known numerical methods on finite systems in order to assess the quality of the approximation.

## References:

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