

Exchange-Correlation functionals inspired to the exact strong coupling limit of density functional theory

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The exact strong-coupling limit of density functional theory (DFT) reveals a mathematical structure very different from the one of traditional approximations for the exchange-correlation functionals [1-3]. Instead of the usual local density, local density gradients, Kohn-Sham orbitals, and related quantities, in this limit we observe the appearance of certain integrals of the density [1-3]. I will illustrate some approximations that we have proposed inspired to this mathematical structure [4]. These approximations retain some of the non-locality of the exact strong-coupling limit of DFT, while being computationally affordable. Their combination with the local information from the weak coupling regime yields encouraging results [5-7].

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