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From density functional to many-body Green's function and beyond

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Density functional theory has been sophisticated considerably by improving the functional form for the exchange, on-site Coulomb, and van der Waals interactions. After demonstrating an impressively successful application to the phase diagram of solid oxygen, we will discuss the problem of excited states and strongly correlated systems. For this purpose, we will review recent development of the first-principles many-body Green's function method and, in addition, consider a possible future combination of nuclear physic and quantum chemistry.

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