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On the separability of dynamical and non-local self-energy effects in correlated materials JAN M. TOMCZAK, Vienna University of Technology — We employ Hedin's GW approximation to correlated metals such as the iron pnictide and chalcogenide superconductors, and the transition metal oxide $SrVO_3$. We find that non-local correlation effects in these systems are non-negligible, and indeed crucial for agreement with experimental observations. This advocates that the gold standard for strongly correlated materials, dynamical mean field theory (DMFT), has to be extended to include non-local self-energy effects even for rather 3D-like systems. However, from our first principles calculations we empirically find the dynamical contribution to the electron self-energy (in particular the quasi-particle weight) to be largely independent of momentum when expressed in a local basis. We substantiate our *ab initio* results by calculations for the 3D Hubbard model within the dynamical vertex approximation. The finding that dynamical and non-local correlations are separable has important consequences for advancing theories that go beyond DMFT. I will discuss the implications on the example of our recent GW+DMFT results for $SrVO_3$.

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