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Self-consistent projection operator approach to momentum dependent excitation spectra YOSHIRO KAKEHASHI, PETER FULDE, Max-Planck-Institute for PKS — Description of the momentum-dependent excitation spectrum with high resolution in momentum and energy at low temperature is a current issue in the theory of strongly correlated electrons. We present such an effective medium approach on the basis of the projection operator technique to the retarded Green function. The momentum dependent self-energy is self-consistently calculated from nonlocal memory function via Fourier transformation. The latters are calculated by means of the incremental cluster expansion using the cluster memory functions embedded in a medium. The medium is self-consistently determined by an extended CPA condition. Our theory has no problem with momentum and energy resolutions and can systematically describe long-range intersite correlations. We demonstrate these advantages by calculating the excitation spectra of the 3D Hubbard model on the simple cubic lattice. We clarify the reduction of the quasiparticle weight, the relaxation of the quasiparticle band width, and the formation of the Mott-Hubbard band due to nonlocal correlations.

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