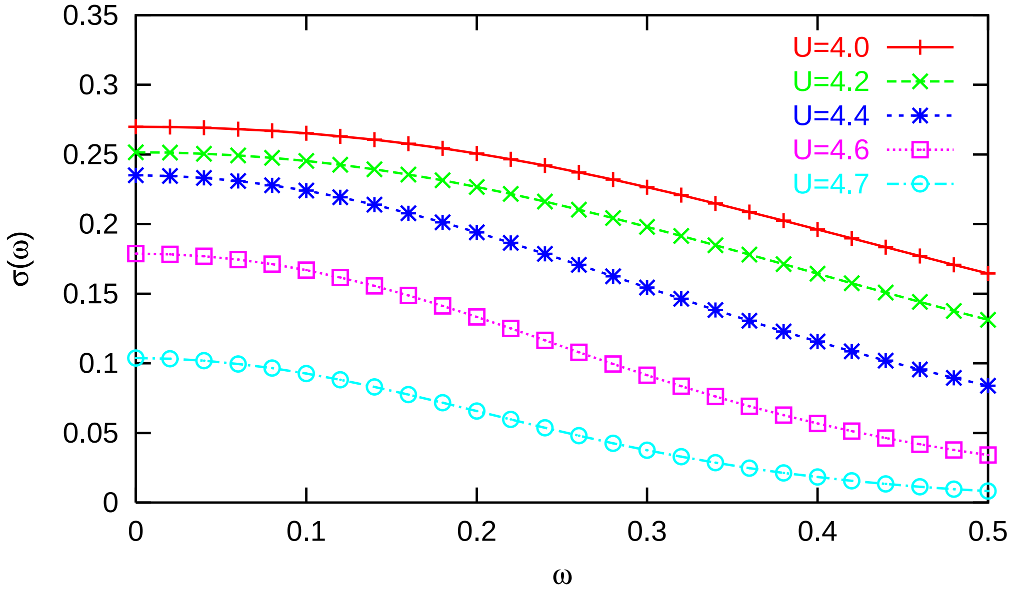

Figure 4.41: Low-frequency part of the optical conductivity $\sigma(\omega)$ for a fully disordered model or Stumpf's layout of the Bethe lattice at $T = 0.05$ in the metallic phase. Due to the incoherent character, no Drude peaks can be identified.

the large width of the low-frequency peaks which here depends on the width of the quasiparticle peak in the spectrum and, therefore, decreases with increasing U. Since the low-frequency part of $\sigma(\omega)$ does not have a Drude shape, the lines in Fig. 4.41 are guides to the eye only. The results for the insulating phase presented in Fig. 4.42 are hardly distinguishable from the corresponding results obtained for the clean stacked case (Fig. 4.39). We may conclude that the conservation of momentum (which applies for the isotropic and the stacked, but not for the disordered model) does not matter for transport in the insulator. In this phase, all relevant states are spread out so far in momentum space that the overlap for a given momentum becomes asymptotically proportional to a constant, i.e., $A_\epsilon(\omega)A_\epsilon(\omega') \propto A(\omega)A(\omega')$. In order to emphasize that offdiagonal disorder matters in general, let us take a look at the noninteracting case. Then, coherent transport is dispersionless, i.e., $\sigma(\omega) \propto \delta(\omega)$. In contrast, dissipation arises for energies up to the bandwidth in the disordered case as shown in Fig. 4.43 for various temperatures and band fillings.

Comparison of the f-sums

The optical f-sums corresponding to the estimates of $\sigma(\omega)$ obtained in the last subsection are displayed in Fig. 4.44a. Evidently, the f-sum is larger for the isotropic than for the stacked Bethe lattice, in particular in the metallic phase. This difference can be attributed to the enhanced squared Fermi velocity in the isotropic model (see Fig. 2.17): The enhancement is largest near the Fermi surface, at $\epsilon = 0$ by a factor of $\pi/2 \approx 1.57$. A corresponding increase in the f-sum is expected in the