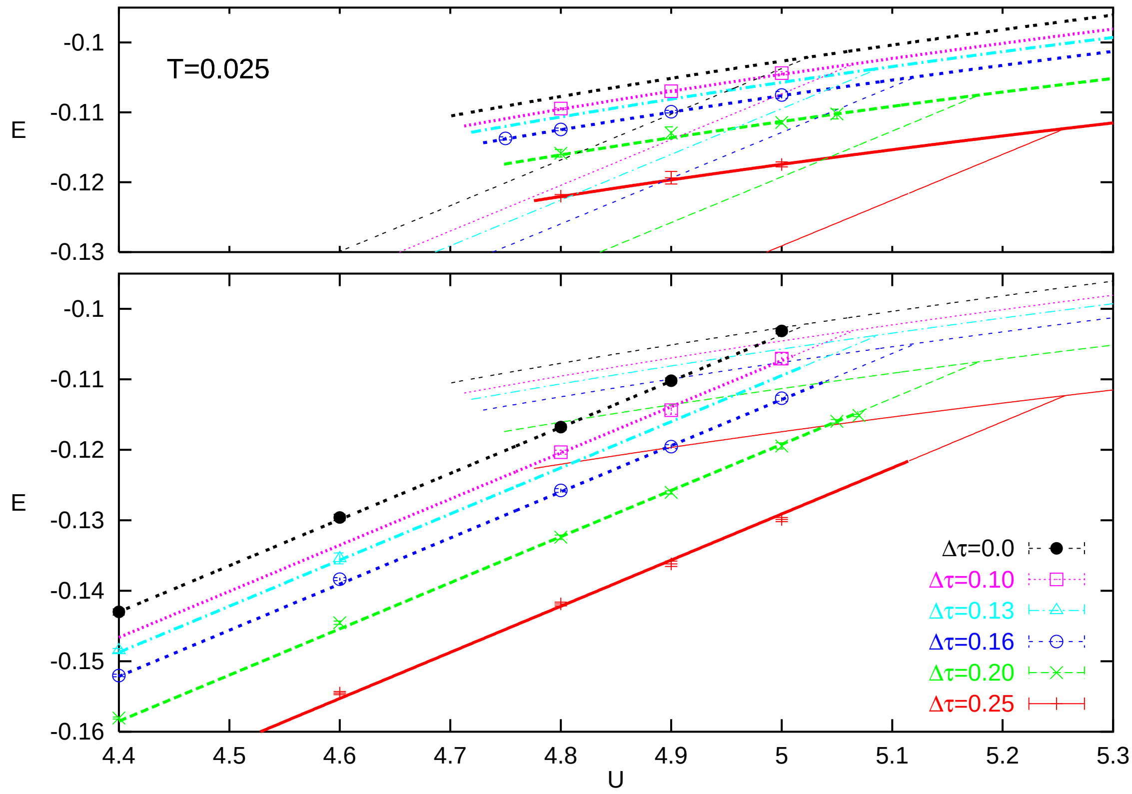

Figure 3.27: Total energy for $T = 1/40$, analogous to Fig. 3.24.

as predominantly one-dimensional,[26] the energy of the metallic phase is expected to be always lower than that of the insulator and that no crossing occurs in any relevant property. We will later make use of the fact established by Moeller et al. (1995) that, at $T = 0$, the metal approaches the insulator continuously. In this special ground state situation, both the energy (as always) and its derivative D vary smoothly at U_{c2}. Approaching the MIT from the metallic side, the Fermi-liquid quasiparticle peak decreases in width (and weight) until it vanishes smoothly at the MIT. Right at the MIT, the difference between metallic and insulating spectrum is only a peak of zero width exactly at the Fermi energy. Since this difference is of measure zero, all observables that can be expressed via integrals over the spectral function must agree. Still, the presence or absence of the quasiparticle peak is a qualitative difference and associated with the fact that the entropy vanishes in the metal, but jumps to a finite value of $\ln 2$ at the MIT (Georges et al., 1996; Gebhard, 1997; Kalinowski and Gebhard, 2002). Thus, our observation that the metallic phase closely approaches the insulating phase in terms of energy and other observables is consistent with general properties of the model, in particular in the low-temperature limit $T \to 0$.

[26] If this remark could be made fully quantitative, we would have found the order parameter. In a qualitative sense, it is based on the smoothness and the observed behavior of $G(\tau)$ and $\operatorname{Im}\Sigma(i\omega_n)$: Solutions (for fixed U) are essentially characterized by $G(\beta/2)$ or $\operatorname{Im}\Sigma(i\pi T)$ (due to the smoothness and since the asymptotic behavior for $\tau \to 0$ and $|\omega_n| \to \infty$ is determined by U alone).