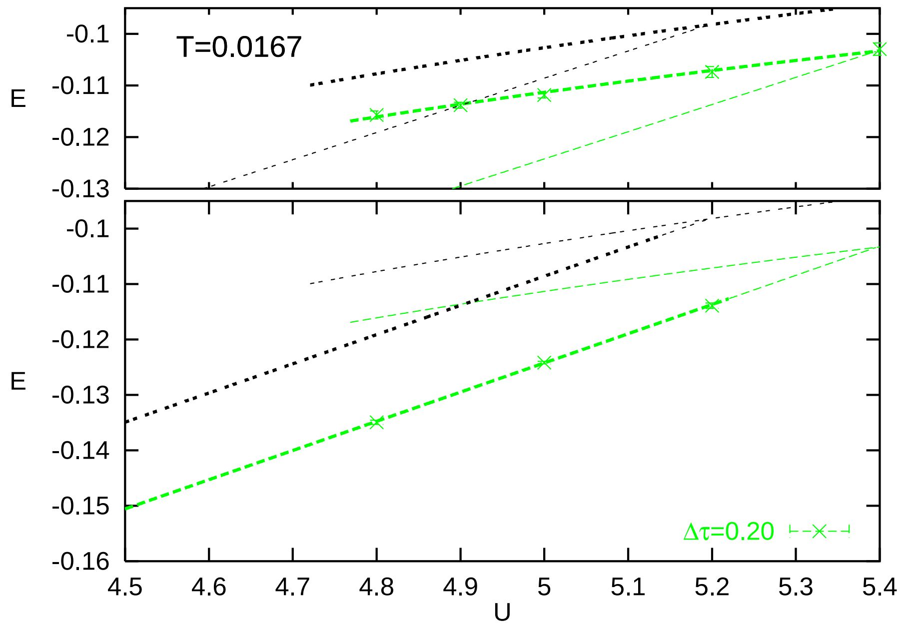


**Figure 3.29:** Total energy for $T = 1/60$. Due to lack of sufficient data, the coefficients for the $\Delta\tau \to 0$ extrapolation are estimated from the results at higher temperature. Otherwise, the plot is analogous to Fig. 3.24.

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region. Again, the excellent agreement between the QMC data and the fit curves implies high confidence in the measured energies as well as the predictions for $U_{c2}$ and $U_{c2b}$.

The QMC data for $T = 0.0167$ (i.e., $\beta = 60$) presented in Fig. 3.29 should be regarded more as the basis of an extrapolation towards lower temperatures than as a complete, independent set of measurements. In fact, simulations were only performed at $\Delta\tau = 0.2$ on a sparse grid. The fit to the metallic solution was then scaled to $\Delta\tau = 0$ with a function whose coefficients in $\Delta\tau^2$ and $\Delta\tau^4$ were both extrapolated from the higher-temperature data. Due to the larger intrinsic error, these results are only used as an indication of the phase boundaries and not for the determination of the first-order phase transition line.

Figure 3.30 summarizes the QMC measurements of the full internal energy, extrapolated to the physical limit $\Delta\tau = 0$. Here, the symbols correspond to the data points labeled as "$\Delta\tau = 0.0$" in Fig. 3.23 – Fig. 3.28. In contrast to these previous plots, however, only those extrapolated data points are included which fall into our estimate of the stability region of the metallic phase. These data points are essentially independent from each other (up to a globally interpolated coefficient for the $\Delta\tau^4$ term in the extrapolation $\Delta\tau \to 0$). The straight narrow lines are the corresponding fits; they are cut off where the metal becomes unstable (towards larger $U$), or where the linearity is expected to break down (towards smaller $U$). The thick black line corresponds to the insulating phase. Its range of stability is not encoded in the plot; the slight increase of its lower edge $U_{c1}$ with increasing $T$ will be seen in Fig. 3.31.