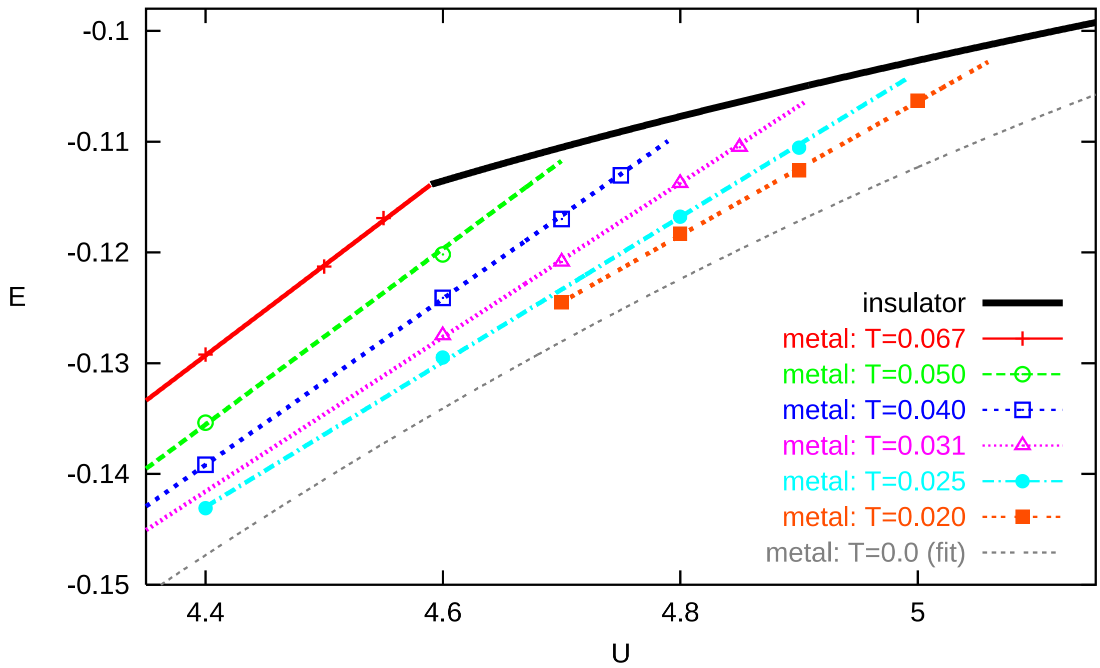

Figure 3.30: Internal energy E vs. interaction U. The symbols and thin colored lines indicate the results of extrapolations $\Delta\tau \to 0$ for QMC data within the metallic phase and the linear fit curves (cf. previous plots). The thick solid line denotes the energy of the insulator within its T-dependent stability region. The thin bottom line marks the ground state energy in the metallic phase as determined in Sec. 3.6.

Also included in the graph is an extrapolation of the energy of the metal to $T = 0$ (see Sec. 3.6).

The most important result obtained so far in this section is certainly the observation of coexisting metallic and insulating solutions for $T \lesssim 1/15$. The corresponding phase diagram, to be shown and discussed in the following subsection 3.5.4, qualitatively agrees with earlier suggestions (cf. Sec. 3.3). A second important point that has not been previously discussed in the literature is the behavior of the energy near the MIT: the dependence of E on U is almost linear both in the metallic phase and in the insulating phase with the slope being significantly lower in the latter. Furthermore, the difference in E (and other properties) is small when the metallic phase becomes unstable at U_{c2} (see the discussion starting on page 104). A third point related to the linearity is the very regular dependence of E on $\Delta\tau$ within each phase. It allows us to determine the phase boundaries with higher precision than has been achieved by other groups using different criteria.

3.5.4 Coexistence Phase Diagram

The implications of the data presented so far for the phase diagram are shown in Fig. 3.31. Here, large crosses mark the boundaries U_{c1} and U_{c2} of the coexistence