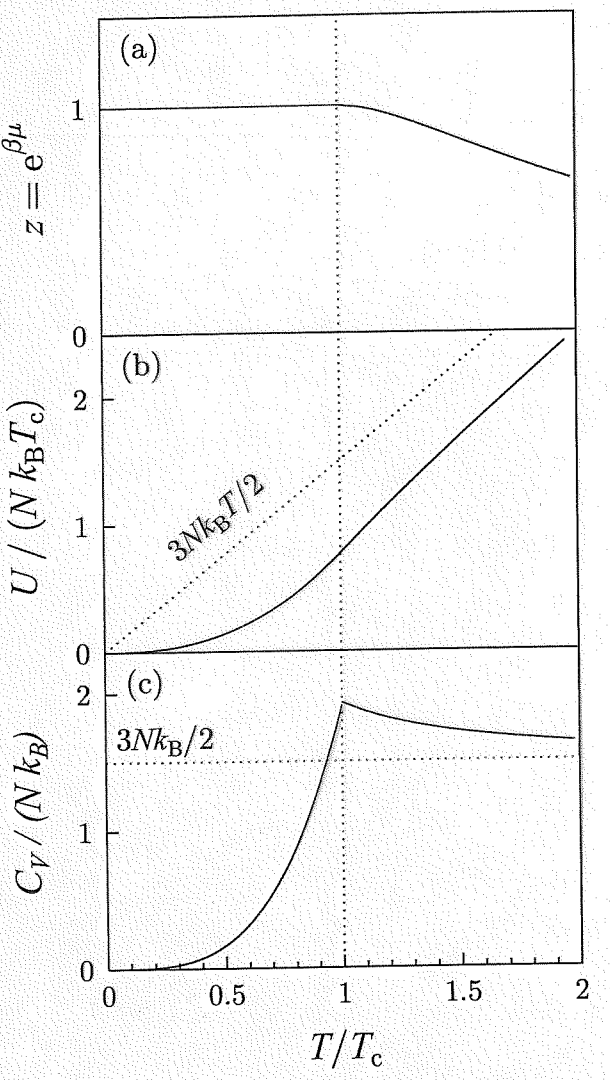

Fig. 30.5 The (a) fugacity, (b) internal energy and (c) heat capacity for a system of bosons as a function of temperature.

which although it cannot be straightforwardly inverted to make z the subject, does show how z is related to T above T_c. (Below T_c, z is practically one.)

The fugacity z, internal energy U and heat capacity C_V, calculated for non-interacting bosons, are plotted in Fig. 30.5. The fugacity is obtained by numerical inversion of eqn 30.63; it rises up towards unity as you cool, and below T_c is not actually one but very close to it. The internal energy U in Fig. 30.5(a) is obtained from eqn 30.62, while the heat capacity C_V is plotted from eqn 30.66, to be proven in the exercises at the end of this chapter.

The Indian physicist S. N. Bose wrote to Einstein in 1924 describing his work on the statistical mechanics of photons. Einstein appreciated the significance of this work and used Bose's approach to predict what