Quantum thermostatics and generalization of Wien's law

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The contribution concerns an important branch of the thermal physics, quantum thermostatics, which deals with the properties of quantum systems near the thermal equilibrium. Despite the fact that such systems, strictly speaking, do not exist in the nature, they satisfactorily approximate many real systems and provide a firm basis for their microscopic description. Assuming that any adiabatically insulated quantum systems at thermal equilibrium can be identified with a set of stationary oscillators of constant eigen-frequencies ω and that the temperature T is Lorentz invariant, it is shown that there exists an adiabatic invariant (kT/$\hbar\omega$) = const., which has to be, in contrast to the prevailing opinion, also Lorentz invariant. This relation, which we tentatively call generalized Wien's law, enables one to measure the temperature of any quantum system by analyzing the spectral distribution of its eigen-frequencies. Two examples of such systems, de Broglie ideal gas and Stewart-Kirchhoff's cavity are discussed in detail.