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The relationship between degrees of freedom and the thermodynamic and Boltzmann entropies in complex thermal systems.

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In complex thermal systems in which the heat capacity varies with temperature, such as a typical Debye solid like silicon, the effective number of active degrees of freedom at any temperature can be defined from the internal energy in combination with equipartition. This allows for a conceptual picture of thermal equilibrium as well as elucidation of the link between the Boltzmann and thermodynamic entropies. It is shown that, in general, thermodynamic entropy is not the same as the Boltzmann entropy but there are clear circumstances under which they are identical. The instructional benefits of this approach are emphasized.

How would you like to present your contribution?

Live in Košice (time slot to be allotted based on the programme)

Target education level (primary)

University education

Target education level (secondary, optional)

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Session Classification: Innovative strategies at University

Track Classification: Innovative strategies and pathways to improve physics education at university