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Thermal equilibrium in a Minkowski spacetime

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It is known the concept of temperature must be generalized to relativity by introducing so called " inverse temperature four vector". The energy is not an independent physical quantity but must form a energy-momentum four vector in relativity. Then, the temperature, which is introduced as a parameter corresponding to energy, must be expressed in a form of four vector somehow. Van Kampen (1968) and Israel (1976) proposed to express the inverse temperature in the form of a four vector to this end.

The essential point of the energy to play the key role in non-relativistic thermodynamics is the fact that it is a conserved quantity. Therefore, the momentum as a conserved quantity must be treated as the same way in relativistic thermodynamics.

In the present study the role of another conserved quantity, angular momentum namely, has been investigated in context of relativistic thermodynamics. It has been shown that there exist another kind of inverse temperature corresponding to angular momentum. This inverse temperature can be expressed in the form of anti-symmetric bi-vector with six components; three components correspond to the spatial rotation and the other three correspond to relativistic constant acceleration.

Papers cited in the above can be found in the reference list of the following paper:
Nakamura, T.K., Europhys.Lett., in press; arXiv:1002.0960

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