

Negative Kelvins

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Hi Sam_Wormley, You wrote:

PhysLink.COM:

When a cosmologist talks about the 'temperature' of a photon they are basically describing the equivalent energy of a photon.
PhysLink.COM/education/askexperts/ae210.cfm

Planck's Law

<http://scienceworld.wolfram.com/physics/PlanckLaw.html>

Good links. There are lots of definitions of temperature.

Although ideal laser (one that's perfectly coherent) is at absolute zero, strong ones can burn through steel (thanks to their relativistic mass). How cool is that ?

Atom lasers employ Bose-Einstein condensates that are near absolute zero.
See:

Wikipedia.ORG/wiki/Bose-Einstein_condensate
Wikipedia.ORG/wiki/Atom_laser

A Bose-Einstein (laser) system's population inversion has negative Kelvins. See:

Since we started with over half the atoms in the spin-down state, initially this drives the system towards a 50/50 mixture, so the entropy is Increasing [dissipated energy], corresponding to a positive temperature.

However, at some point more than half of the spins are in the spin-up position. In this case, adding additional energy Reduces the entropy [accumulated energy] since it moves the system further from a 50/50 mixture.

This reduction in entropy with the addition of energy corresponds to a negative temperature.

This phenomenon can also be observed in many lasing systems, wherein a large fraction of the system's atoms (for chemical and gas lasers) or electrons (in semi-conductor lasers)

Negative Kelvins

are in excited states. This is referred to as a population inversion.
__ [Wikipedia.ORG/wiki/Negative_temperature](https://en.wikipedia.org/wiki/Negative_temperature)