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Mixing the directions of thermodynamic time ALEXANDER KLIMENKO, The University of Queensland, ULRICH MAAS, Karlsruher Institut fur Technologie — Conventional thermodynamics is formulated and tested in the world populated almost solely by matter; it can be consistently extended to antimatter in two mutually excluding ways: CP-invariant or CPT-invariant. While CP-invariant thermodynamics is more or less conventional; its CPT-invariant counterpart results in different directions of the thermodynamic time for matter and antimatter and in their thermodynamic antagonism – antimatter seems to us very hot due to having negative apparent temperatures. In spite of the similarity of thermodynamic properties of matter and antimatter, CPT-invariant thermodynamics favours conversion of antimatter into matter (in our time). While thermodynamic properties of systems and antisystems under conditions of CPT invariance are more or less clear, properties of mixtures of particles and antiparticles pose a more difficult problem. The major difficulty is in evaluating implications of mixing of two different time primers with the opposite direction of induced thermodynamic time. In the present work we analyse the effect of mixing of directions of time resulting from mixing of matter and antimatter under conditions of CPT-invariant thermodynamics.

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