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Proper Effective Temperature and Order Parameters in Relativistic Non-Equilibrium Steady States

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We investigate a spontaneous symmetry breaking of a relativistic (2+1)-dimensional defect moving at a constant velocity in a (3+1)-dimensional heat bath using the D3-D5 model of the gauge/gravity duality. We find that the dependence of the order parameter on the heat-bath temperature and the defect velocity is uniquely expressed through a single variable, the proper effective temperature, for the moving defect. Our results suggest that the proper effective temperature is an essential parameter for a class of relativistic non-equilibrium steady states.

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