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“Time” replaced by quantum correlations: experimental visualization.

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The description of time in quantum mechanics and in particular in connection with quantum gravity and cosmology has always presented significant difficulties. One of descriptions based on Page and Wootters (PaW) mechanism which considers “time” as a quantum degree of freedom[1]. Here we give a complete review of the Page and Wootters’ quantum time mechanism and provide experimental illustrations that are able to describe time as an emergent property of quantum correlations and giving us access to the possibility of a test of the Leggett-Garg inequalities.

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[1] D.N. Page and W.K. Wootters, Phys. Rev. D 27, 2885 (1983).

[2] E. Moreva, M. Gramegna, G. Brida, L. Maccone, M. Genovese, “Quantum time: Experimental multitime correlations”, Physical Review D 96 (10), 102005 (2017)

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