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Noncommutative spectral geometry, algebra doubling and the seeds of quantization

Mairi Sakellariadou, Antonio Stabile, Giuseppe Vitiello

A physical interpretation of the two-sheeted space, the most fundamental ingredient of noncommutative spectral geometry proposed by Connes as an approach to unification, is presented. It is shown that the doubling of the algebra is related to dissipation and to the gauge structure of the theory, the gauge field acting as a reservoir for the matter field. In a regime of completely deterministic dynamics, dissipation appears to play a key role in the quantization of the theory, according to 't Hooft's conjecture. It is thus argued that the noncommutative spectral geometry classical construction carries implicit in its feature of the doubling of the algebra the seeds of quantization.

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