



Chern-Simons theory for the noncommutative 3-torus

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We study the Chern-Simons action, which was defined for noncommutative spaces in general by the author, for the noncommutative 3-torus, the universal C*-algebra generated by 3 unitaries. D. Essouabri, B. Iochum, C. Levy, and A. Sitarz constructed a spectral triple for the noncommutative 3-torus. We compute the Chern-Simons action for this noncommutative space. In connection with this computation we calculate the first coefficient in the loop expansion series of the corresponding Feynman path integral with the Chern-Simons action as Lagrangian. The result is independent of the deformation matrix of the noncommutative 3-torus and always 0.

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