Albeverio, Sergio; **Cianci, Roberto**; **Khrennikov, Andrew**
On the Fourier transform and the spectral properties of the p-adic momentum and Schrödinger operators. (English) Zbl 0927.46060
J. Phys. A, Math. Gen. 30, No. 16, 5767-5784 (1997).

The authors continue the study of the p-adic model of quantum mechanics initiated in their previous papers [*S. Albeverio, A. Khrennikov*, J. Phys. A, Math. Gen. 29, 5515-5527 (1996; Zbl 0903.46073); *S. Albeverio, R. Cianci, A. Khrennikov*, J. Phys. A, Math. Gen. 30, 881-889 (1997)]. In particular, a version of the Fourier transform is introduced, which is adapted to the spaces used in the paper, L_2-spaces with respect to the p-adic Gaussian distribution.

In the momentum representation the analogue of the momentum operator is similar to the position operator of the coordinate representation, which was studied earlier. As a result, spectral properties of the momentum operator are investigated. A possible physical meaning of the results is discussed, in particular the idea of a p-adic description of the finite exactness of measurement.

For another recent p-adic model of quantum mechanics, which is closely related to classical constructions of p-adic analysis, see the paper by the reviewer [*A. N. Kochubei*, J. Phys. A, Math. Gen. 29, 6375-6378 (1996; Zbl 0905.46051)].

Reviewer: Anatoly N.Kochubei (Kiev)

MSC:

46S10	Functional analysis over fields other than $\mathbb{R}$ or $\mathbb{C}$ or the quaternions; non-Archimedean functional analysis
81S05	Commutation relations and statistics as related to quantum mechanics (general)
81P15	Quantum measurement theory, state operations, state preparations
11S80	Other analytic theory (analogues of beta and gamma functions, p-adic integration, etc.)
81Q05	Closed and approximate solutions to the Schrödinger, Dirac, Klein-Gordon and other equations of quantum mechanics

Cited in **8** Documents

Keywords:

p-adic quantum mechanics; p-adic Fourier transform; momentum operator; position operator; measurement; p-adic Gaussian distribution

Full Text: DOI