

Albeverio, S.; Cianci, R.; Khrennikov, A. Yu.

Operator calculus for p -adic valued symbols and quantization. (English) Zbl 1244.47065
Rend. Semin. Mat., Univ. Politec. Torino 67, No. 2, 137-150 (2009).

The paper gives a brief review of the quantum formalism with p -adic variables and p -adic valued wave functions. In particular, the authors discuss p -adic Banach spaces, including those equipped with an inner product (note that in these Hilbert-like spaces the inner product does not agree with the norm), groups of operators preserving the inner product, spaces of square integrable functions with respect to the p -adic Gauss distribution; p -adic position and momentum operators and their properties. See also another survey by the same authors, *S. Albeverio, R. Cianci and A. Yu. Khrennikov* [p -Adic Numbers Ultrametric Anal. Appl. 1, No. 2, 91–104 (2009; [Zbl 1187.81137](#))].

In the authors' words, " p -adic valued quantum theory suffers from the absence of a 'good spectral theorem' for symmetric operators." Subsequently, a spectral theorem for a class of operators on p -adic Banach spaces was proved by the reviewer; see *A. N. Kochubei* ["Non-Archimedean normal operators", *J. Math. Phys.* 51, No. 2, 023526 (2010; [doi:10.1063/1.3293980](#))].

Reviewer: [Anatoly N. Kochubei \(Kyïv\)](#)

MSC:

- [47S10](#) Operator theory over fields other than \mathbb{R} , \mathbb{C} or the quaternions; non-Archimedean operator theory
- [11S80](#) Other analytic theory (analogues of beta and gamma functions, p -adic integration, etc.)
- [11E95](#) p -adic theory
- [47N50](#) Applications of operator theory in the physical sciences
- [81S99](#) General quantum mechanics and problems of quantization

Cited in 1 Document

Keywords:

p -adic valued wave functions; p -adic Gauss distribution; p -adic position operator; p -adic momentum operator

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