

Functorial quantization of linear canonical relations

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Linear canonical relations between symplectic vector spaces form a category with respect to set-theoretic composition, but this composition needs to be refined before it is suitable for quantization. Without this refinement, and related modification on the quantum side, one would have to, for example, square the Dirac delta function and obtain a distribution.

In this talk, based in part on work with Theo Johnson-Freyd and David Li-Bland, I will present three very different ways of building a suitable refinement which lead to equivalent results. One is “by hand,” one uses a categorical construction of Wehrheim and Woodward, and one is based on ideas from derived symplectic geometry. It is the third way which leads to a quantization functor, where the operators on the quantum side are replaced by bimodules over Weyl algebras, with composition given by derived tensor product.