Gotay, Mark J. (1-HI); Grundling, Hendrik B. (5-NSW-PM)
On quantizing $T^* S^1$. (English. English summary)

An old Groenewold-Van Hove theorem states that it is impossible to consistently quantize even the polynomial algebra on the symplectic manifold $\mathbb{R}^{2n}$. The paper under review is part of a programme which aims to clarify the situation with other symplectic manifolds of interest. Here it is proven that the situation with $T^* S^1$ resembles closely that with $\mathbb{R}^{2n}$ but there are some differences as well. They are ascribed to the non-simple connectivity of the cylinder. As a by-product, the authors obtain a stronger version of the Groenewold-Van Hove “no-go” theorem for $\mathbb{R}^2$. One should notice as well the presence of the real parameter ($\eta$ in the paper) in the constructed irreducible representation of the maximal quantizable Lie subalgebra which deserves special attention as its meaning is not quite clear in this context.

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