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The spinor bundle on loop space

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Abstract: Understanding spin geometry on the loop space has been a goal of mathematical research at least since Witten's seminal paper on „the Dirac operator on loop space“. From the start, a key task has been to relate the spin conditions to conditions on the manifold itself, and to find geometric structures that make the spinor bundle behave „local“ in the manifold.

A suggestion was given by Peter Teichner and Stefan Stolz in a 2005 preprint that, however, never made it to publication, as they were unable to prove several of their key assertions. Their key idea was that on string manifolds, the loop space spinor bundle should carry a so-called „fusion product“ that allows to descend it to a higher structure on the manifold itself.

In this talk, we will discuss the definition of the spinor bundle on loop space and the construction of its fusion product. This is based on work by Kristel and Waldorf, involving several simplifications and additions due to myself; see <https://arxiv.org/abs/2305.12521>.

