



## The Mill 2020 vs Corona – Round 2

MICHAEL HEINS (UNIVERSITÄT WÜRZBURG)

A topological tensor product

8 April 2020

14.15h – Please note the changed schedule!

### Abstract

Already in naive quantum mechanics one encounters tensor products of normed spaces, when passing from the wave function description of a single particle to a multiple particle system. Here one uses the additional structure of the involved Hilbert spaces to turn the tensor product into a Hilbert space again. For  $C^*$  algebraic considerations the same problem arises, now with different structure to make use of. Making this mathematically precise amounts to building a norm for the tensor product of normed spaces, using given norms on the tensor factors. It turns out that this is a non-trivial *choice* in general, as different constructions can yield inequivalent norms and hence different completions. In this talk, I am going to discuss perhaps the naivest construction: the so called projective tensor product. Furthermore I am going to argue that this is in fact a very good choice for numerous reasons by highlighting key properties of the projective tensor product. While I am only going to introduce the concepts for normed spaces, there will be hints at the straight forward generalization to general locally convex spaces. Finally, I am going to indicate some other possible constructions and how these considerations lead to the notion of nuclear spaces.

We meet 15min before the talk starts on discord, make sure to have zoom installed. Write to mschotz (YouKnowWhatSymbolComesHere) ulb.ac.be if you don't have access yet or have any questions.