Categorical Symmetries in Quantum Field Theory (Conference and School)



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Kevin Walker: Categorified idempotent completion, topological symmetries of QFTs, and generalized Kramers-Wannier duality

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Any (n-pivotal) n-category C can be embedded in a Morita-equivalent completion C^{*}#. Because of the Morita equivalence, any module/action of C automatically leads to one of the larger category C^{*}#. In particular, discrete k-form symmetries of d-dimensional QFTs correspond to actions of $C(G, d+1, k+1) = pi_{\ell}(d+1)(B^{k+1}(G))$, and therefore give rise to actions of the completed (d+1)-category $C(G, d+1, k+1)^*$. While C(G, d+1, k+1) is built out of invertible morphisms, $C(G, d+1, k+1)^*$ typically contains many non-invertible morphisms leading to non-invertible symmetries of the original QFT. I'll also discuss how completed n-categories can be used to construct many new examples of Kramers-Wannier-type dualities. This is joint work with Fiona Burnell.