ID de Contribution: **53**   Type: **Non spécifié**

3d SUSY Gauge Theory and Quantum Groups at Roots of Unity

vendredi 9 juillet 2021 17:30 (1 heure)

Topological twists of 3d N=4 gauge theories naturally give rise to non-semisimple 3d TQFT's. In mathematics, prototypical examples of the latter were constructed in the 90's (by Lyubashenko and others) from representation categories of small quantum groups at roots of unity; they were recently generalized in work of Costantino-Geer-Patureau Mirand and collaborators. I will introduce a family of physical 3d quantum field theories that (conjecturally) reproduce these classic non-semisimple TQFT's. The physical theories combine Chern-Simons-like and 3d N=4-like sectors. They are also related to Feigin-Tipunin vertex algebras, much the same way that Chern-Simons theory is related to WZW vertex algebras.
(Based on work with T. Creutzig, N. Garner, and N. Geer.)

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