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Localization as a bridge between String Theory and QFT

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4d Yang-Mills theories with extended supersymmetry represent a playground for investigating non-perturbative features and techniques in QFT. Pestun showed that the path integral defining certain protected oservables, both local and non local, localizes to a matrix integral. This great simplification paves the road toward obtaining explicit results at strong coupling and making contact with holographic descriptions. The matrix model is gaussian in the maximally supersymmetric N=4 case, while for generic N=2 theories it has complicated interactions. We will describe the "full Lie Algebra" approach, developed mostly in our groups, to deal with it. It suggests an efficient organization of the perturbative expansion, both in conformal and non conformal cases. In conformal theories, it permits in many cases to resum the perturbative expansion and, in the 't Hooft linit, to extrapolate it to strong coupling. We describe the type of results and that can be obtained for correlators and integrated correlators involving chiral and antichiral operators as well as Wilson loops and their relation to the dual holographic realization.

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