Contribution ID: **22** Type: **not specified**

Description of curved spaces by finite-size matrices

We study regularization of matrices in the covariant derivative interpretation of matrix models, In the covariant derivative interpretation, curved spacetimes are described by matrices that are viewed as differential operators. One needs to regularize the operators as finite-size matrices in order to apply the interpretation to nonperturbative calculations such as numerical simulations. We develop a method of regularizing the covariant derivatives for Kahler manifolds by using the Berezin-Toeplitz quantization. As examples, we discuss the cases of S2 and T^2n in details.

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Session Classification: Poster session