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**Rethinking
Quantum Field Theory**

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The semi-classical energy of rotating Nambu-Goto strings

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In the sense of perturbation theory around arbitrary classical solutions, the Nambu-Goto (NG) string can be consistently quantised as an effective theory for any dimension D of the target space [Comm. Math. Phys. 327 (2014) 779, with D. Bahns & K. Rejzner]. In this framework, we compute semi-classical corrections to the energy of rotating NG strings, using the locally covariant renormalisation scheme developed in the context of QFT on curved space-times by Hollands & Wald. For the open NG string, we find that the energy density diverges in a non-integrable way at the boundaries. Regularizing these divergences with boundary counterterms, we find the Regge intercept $a = 1 + (D - 2)/24$. For the closed NG string, the energy density is finite and yields the same intercept. For this value of a, the NG string can not be quantised consistently in the covariant scheme for any dimension. [based on arXiv:1605.07928]

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