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Vogel Universality in 2D Yang–Mills Theory

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We study adjoint Wilson loops in two-dimensional Yang–Mills theory for classical, exceptional, and $\mathfrak{osp}(1|2n)$ Lie (super)algebras. The Wilson loops are evaluated numerically using the Migdal representation-sum formula and compared across different Lie families within Vogel's parametrization. Our main goal is to investigate whether this observable admits a universal description on Vogel's plane, including its large-rank expansion. We find substantial agreement between different series at leading order in the algebra rank and obtain a common Vogel-based continuation that gives a good description of many exceptional-group results. Moreover, the subleading corrections for different series can be jointly parametrized by functions of the Vogel parameters. These results provide evidence for a nontrivial Vogel-universal structure of adjoint Wilson loops, at least in the large-rank limit.

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