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*$\mathcal{N} = 4$  Supersymmetric Yang-Mills Correlators from Supergravity*

Computational techniques to study  $AdS_5 \times S^5$  supergravity are limited by standard quantum field theory techniques in curved backgrounds. One may hope to bootstrap non-trivial results from the  $\mathcal{N} = 4$  supersymmetric Yang-Mills (SYM) conformal field theory (CFT) dual since conformal theory correlators are fully specified by their spectrum and operator product expansion coefficients. Thanks to the recent discovery of inversion integrals based on the classic Froissart-Gribov dispersion inversion formula, one can now extract the CFT data as an analytic function of spin. By utilizing general bootstrap techniques, we present a framework to analytically study the large-N supergravity limit of  $\mathcal{N} = 4$  SYM by describing the spectrum of intermediate double-trace operator exchange from a four-point function half-BPS scattering process.