

$Sp(2N)$ Gauge Theories on the Lattice

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¹*Katz, Nelson and Walker*, “The Intermediate Higgs”, 2005.

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- In order to understand $Sp(2N)$ theories more it is worth studying their Yang-Mills sectors both pure and with fermions.

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Pure $Sp(2N)$ Yang-Mills

A detailed study of the glueball spectrum has been undertaken in pure $Sp(2N)$ Yang-Mills theory:

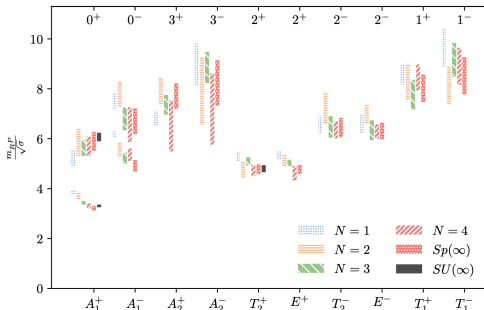


Figure 1: The glueball mass spectrum of $Sp(2N)$ for $N = 1, 2, 3, 4$ and $N \rightarrow \infty$ as well as $SU(\infty)$.²

²*Bennett et. al.*, “Glueballs and strings in $Sp(2N)$ Yang-Mills theories”, arXiv: 2010.15781.

$Sp(2N)$ with fermions

A natural continuation to exploring pure Yang-Mills is to examine same in the presence of fermions specifically the meson mass spectrum.

This has already been done in the case of $Sp(4)$.³ As with the glueball spectrum, the plan is to compute the spectrum for $N = 1, 2, 3, 4$ and the extrapolate to $N \rightarrow \infty$.

³*Bennett et. al.*, “ $Sp(4)$ gauge theories on the lattice: Quenched fundamental and antisymmetric fermions”, 2020.

Work in progress

PhD has boiled down to mass producing numbers...

