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Computing the SU(N) Shur index for N=4 super Yang-Mills

In this talk, I will discuss a computation of the Schur Index of $\mathcal{N} = 4$ super Yang-Mills theory with $SU(3)$ gauge group. The Schur index counts the number of 1/8 BPS states of a theory. In order to find the gauge invariant (physical) states one must compute several nested complex contour integrals. Through Cauch's theorem, this reduces to finding the residues of the integrands of these integrals. However, there are an infinite number of these residues. We use the partial ellipticity property of the integrand to find all the residues. This computation is the first step to see if we can find any trends relating the rank of the gauge group to the Schur index. The ultimate goal being able to find the Schur index for $\mathcal{N} = 4$ super Yang-Mills with a $SU(N)$ gauge group, where N is arbitrary.

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