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A generalized dominance ordering for 1/2-BPS states

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Friday, 7 July 2023 @ 14h00 SAST
Venue: Physics Seminar Room, Stellenbosch University, and online

ABSTRACT
I discuss a generalized dominance ordering for irreducible representations of the symmetric group S_{n} with the aim of distinguishing the corresponding states in the 1/2-BPS sector of $U(N)$ Super Yang-Mills theory when a certain finite number of Casimir operators are known. Having knowledge of a restricted set of Casimir operators was proposed as a mechanism for information loss in this sector and its dual gravity theory in AdS$_{5}\times S^{5}$. It is well-known that the states in this sector are labeled by Young diagrams with n boxes. I propose a generalization of the well-known dominance ordering of Young diagrams. Using this generalization, I posit a conjecture to determine an upper bound for the number of Casimir operators needed to distinguish between the 1/2-BPS states and thus also between their duals in the gravity theory. I offer numerical and analytic evidence for the conjecture. Lastly, I discuss implications of this conjecture when the energy n of the states is asymptotically large.

BIOGRAPHY

I am a theoretical physicist and lecturer at the University of Johannesburg. I obtained my PhD at the University of the Witwatersrand working in high energy physics and AdS/CFT. I am also currently interested in quantum information in quantum field theory.

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