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Exact stringy microstates from gauge theories

We study how the microstates of BPS sectors in string theory are encoded in the dual $U(N)$ gauge theory. The microstates take the form of a coherent sum of stacks of branes and their open/closed string excitations. We propose a prescription to construct the indices of string/brane configurations by analyzing the modifications of determinant operators in gauge theory. The strings and branes should be interpreted in the tensionless limit of string theory, but their indices are exact at finite N . In various examples, we provide evidence that a sum, of the giant graviton-type recently proposed in the literature, over all such configurations gives the finite N gauge theory index. Finally, we discuss how these microstates assemble in the BPS Hilbert space and in what circumstances the branes can form bound states to produce black hole degeneracies.

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