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Mock modularity of Calabi-Yau threefolds

Monday 20 January 2025 11:00 (1 hour)

I'll explain the modular properties, and their physical origin, of the generating functions of rank 0 DT invariants of Calabi-Yau threefolds counting D4-D2-D0 bound states in type II compactifications of string theory. These properties can be used to find generating functions up to a finite number of coefficients, the so-called polar terms, which in turn can be fixed using wall-crossing. I'll show how this program is realized for compact one-parameter Calabi-Yau threefolds and 2 units of D4-brane charge, leading to explicit mock modular forms encoding BPS indices. For higher charges, the polar terms remain so far inaccessible, but I'll present a general solution of modular anomaly equations in terms of indefinite theta series.

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