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Representation-theoretic and combinatorial structure of moduli spaces, e.g.:

- Quantum groups actions on cohomology/K-theory of moduli spaces
- Enumerative invariants – particularly K-theoretic (Donaldson-Thomas-type) invariants

Key example: $\mathrm{Hilb}_n(S)$ (and tautological bundle $\mathcal{O}^{[n]}$)

For example, computing two limits of the K-theoretic DT partition function of a particular threefold, we deduce:

$$\frac{\sum_{m,n\geq 0}^{\infty} \chi\left(\mathrm{Hilb}_n \mathbb{C}^2, \bar{S}^m(\mathcal{O}^{[n]})\right) y^m q^n}{\text{same with } y = 0}$$

is symmetric under $q \leftrightarrow y$.

- Other geometric/physical/representation-theoretic interpretations of above result
- Other moduli of sheaves/tautological classes, other invariants (χ_y-genera, elliptic genera)
- K-theoretic DT/stable pairs correspondence & relation with quantum K-theory
- K-theoretic DT invariants $\overset{?}{\leftrightarrow}$ refined/motivic DT invariants