JIM BRYAN, University of British Columbia

Curve counting on (K3xE)/G and Siegel modular forms

For a cyclic group G of order N acting symplectically on a $K3$ surface S and by translation on an elliptic curve E, we consider the Calabi-Yau threefold X given by $X = (S \times E)/G$. We conjecture that the Donaldson-Thomas partition function of X is given by a certain genus 2 Siegel modular form Φ_N which is of weight $\lceil \frac{24}{N+1} \rceil - 2$. We provide strong evidence for the conjecture and discuss the connection with CHL models in physics, Mathieu moonshine, and elliptic genera.