

## *Spin Curves and Mirror Symmetry*

### Abstract:

We will start from explicit examples of a phenomenon which is apparently completely unrelated to the subject of the event: pairs of Calabi-Yau varieties  $(X, Y)$  of dimension three which are dual in the sense of mirror symmetry:  $h^{p,q}(X; \mathbf{C}) = h^{3-p,q}(Y; \mathbf{C})$ . We will formulate a more general statement and a proof which will allow us to present a new approach (Fan-Jarvis-Ruan) to the quantum cohomology of Calabi-Yau varieties by means of  $r$ -spin curves. These are algebraic curves of genus  $g$  equipped with a line bundle  $L$ , whose  $r$ th power is isomorphic to the canonical bundle:  $L^r \cong \omega$ . The geometry of the moduli spaces of  $r$ -spin curves is still largely unexplored and recent techniques in terms of matrix factorisations (Polishchuk-Vaintrob) provided a new approach to the problem of computing quantum intersection numbers.

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