

Disk Instantons, Mirror Symmetry and the Duality Web

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We apply the methods recently developed for computation of type IIA disk instantons using mirror symmetry to a large class of D-branes wrapped over Lagrangian cycles of non-compact Calabi-Yau 3-folds. Along the way we clarify the notion of “flat coordinates” for the boundary theory. We also discover an integer IR ambiguity needed to define the quantum theory of D-branes wrapped over non-compact Lagrangian submanifolds. In the large N dual Chern-Simons theory, this ambiguity is mapped to the UV choice of the framing of the knot. In a type IIB dual description involving (p, q) 5-branes, disk instantons of type IIA get mapped to (p, q) string instantons. The M-theory lift of these results lead to computation of superpotential terms generated by M2 brane instantons wrapped over 3-cycles of certain manifolds of G_2 holonomy.

Key words: Supersymmetry; Open String Theory; Topological Theories; Mirror Symmetry.