MATHEMATICS AND STRING THEORY

Principal Investigator: Shing-Tung Yau
Department of Mathematics
Harvard University
Cambridge, MA 02138

I. FINAL REPORT ON DOE GRANT DE-FG02-88ER25065

The Principal Investigator wrote several papers covering the following areas:

The continuation of collaboration with Liu and Lian on calculation of II A model, opens up possibility to understand calculations for higher genus curves also. A lot of detail calculations based on the idea of Liu-Lian-Yau method was carried out by Lian-Liu-Yau. It provides evidence that the method is powerful to calculate GW invariants in many cases. Local mirror symmetry is also worked out by Chiang, Klemm, Zaslow and the principal investigator. It is consistant with what is predicted by physics intuition. Many works were carried out on pushing forward the ideas of Strominger-Yau-Zaslow 's geometric version of mirror symmetry in terms of special Lagragian torus fibration. Several papers were carried out with Zaslow, Leung and others on understanding such duality. It fits beautifully with the predictions. The ideas are still being studied.

II. LIST OF PUBLICATIONS

DISCLAIMER

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Naichung Conan Leung, Shing-Tung Yau, Eric Zaslow; "From Special Lagrangian to Hermitian-Yang-Mills via Fourier-Mukai Transform" Adv.Theor.Math.Phys. 4 (2002) 1319-1341
math.DG/0005118

Sergei Gukov, Shing-Tung Yau, Eric Zaslow; "Duality and Fibrations on G_2 Manifolds"
hep-th/0203217

T.-M. Chiang, A. Klemm, S.-T. Yau, E. Zaslow; "Local Mirror Symmetry: Calculations and Interpretations" Adv.Theor.Math.Phys. 3 (1999) 495-565
hep-th/9903053

Andrew Strominger, Shing-Tung Yau, Eric Zaslow; "Mirror Symmetry is T-Duality" Nucl.Phys. B479 (1996) 243-259
hep-th/9606040

Shing-Tung Yau, Eric Zaslow; "BPS States, String Duality, and Nodal Curves on K3"
Nucl.Phys. B471 (1996) 503-512
hep-th/9512121

Bjorn Andreas, Gottfried Curio, Daniel Hernandez Ruiperez, Shing-Tung Yau; "Fibrewise T-Duality for D-Branes on Elliptic Calabi-Yau" JHEP 0103 (2001) 020
hep-th/0101129

Bjorn Andreas, Gottfried Curio, Daniel Hernandez Ruiperez, Shing-Tung Yau; "Fourier-Mukai Transform and Mirror Symmetry for D-Branes on Elliptic Calabi-Yau"
math.AG/0012196

Bong H. Lian (Brandeis University), Chien-Hao Liu (Harvard University), Kefeng Liu (University of California at Los Angelas), Shing-Tung Yau (Harvard University); "The S^1 fixed points in Quot-schemes and mirror principle computations"
math.AG/0111256

Yi Hu (U. Texas at Arlington), Chien-Hao Liu, Shing-Tung Yau (Harvard University); "Toric morphisms and fibrations of toric Calabi-Yau hypersurfaces"
math.AG/0010082

Bong H. Lian (Brandeis University), Chien-Hao Liu, Shing-Tung Yau (Harvard University); "A reconstruction of Euler data"
math.AG/0003071

Chien-Hao Liu, Shing-Tung Yau (Harvard University); "On the Splitting Type of an Equivariant Vector Bundle over a Toric Manifold"
math.AG/0002031

B. Lian, K. Liu, S.T. Yau; "Mirror Principle I"
alg-geom/9712011

Shinobu Hosono, Bong H. Lian, Keiji Oguiso, Shing-Tung Yau; "Autoequivalences of Derived Category of A K3 Surface and Monodromy Transformations"
math.AG/0201047

Bong H. Lian, Andrey Todorov, Shing-Tung Yau; "Maximal Unipotent Monodromy for Complete Intersection CY Manifolds"
math.AG/0008061

A. Klemm, B. Lian, S.-S. Roan, S.-T. Yau; "Calabi-Yau fourfolds for M- and F-Theory compactifications" Nucl.Phys. B518 (1998) 515-574
hep-th/9701023

S.Hosono, B.H.Lian, S.-T.Yau; "Calabi-Yau Varieties and Pencils of K3 Surfaces"
alg-geom/9603020

S.Hosono, B.H.Lian, S.-T.Yau; "Maximal Degeneracy Points of GKZ Systems"
alg-geom/9603014

S.Hosono, B.H.Lian, S.-T.Yau; "GKZ-Generalized Hypergeometric Systems in Mirror Symmetry of Calabi-Yau Hypersurfaces" Commun.Math.Phys. 182 (1996) 535-578
alg-geom/9511001

Bong H. Lian, Shing-Tung Yau; "Mirror Maps, Modular Relations and Hypergeometric Series II" Nucl.Phys.Proc.Suppl. 46 (1996) 248-262
hep-th/9507153

Bong H. Lian, Shing-Tung Yau; "Mirror Maps, Modular Relations and Hypergeometric Series I"
hep-th/9507151

Bong H. Lian, Shing-Tung Yau; "Arithmetic Properties of Mirror Map and Quantum Coupling" Commun.Math.Phys. 176 (1996) 163-192
hep-th/9411234

A. Klemm, B.H. Lian, S.S. Roan, S.-T. Yau; "A Note on ODEs from Mirror Symmetry"
hep-th/9407192