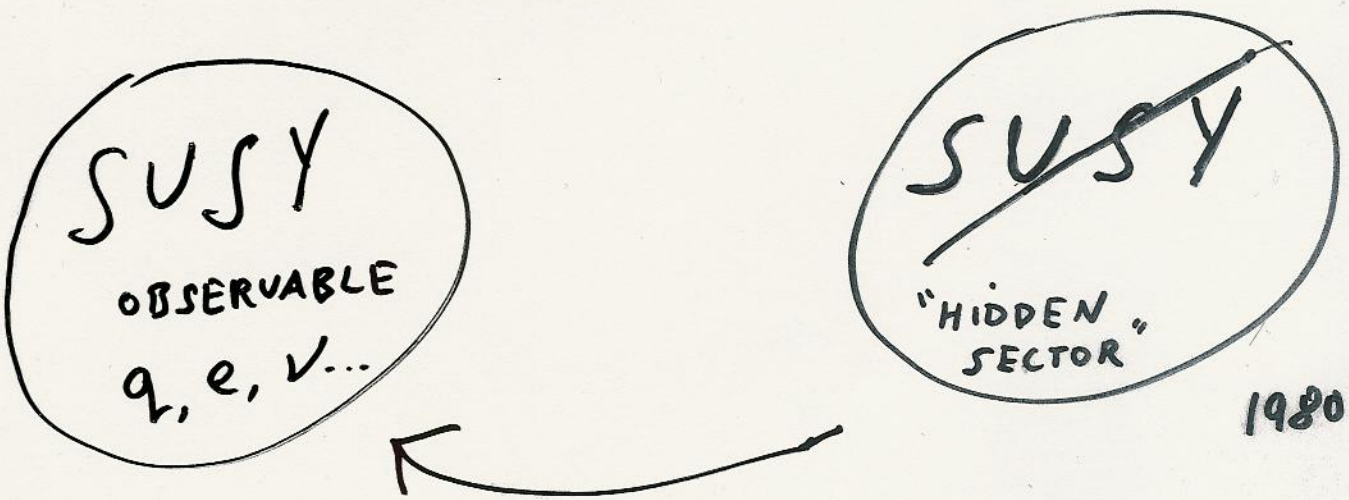
STRINGY MEDIATION OF SUSY BREAKING

w/ ANTONIADIS & NARAIN



SUSY BREAKING

F-TERM $\delta\psi = \epsilon F$ (SUPERPOTENTIAL

↖ CHIRAL

↳ GRAVITY & "ANOMALY" MEDIATION

D-TERM $\delta\lambda = \epsilon(D + \sigma_{ij} F_{ij})$

(FAYET-ILIOPOULOS)

↳ GAUGE MEDIATION

F-TERM BREAKING

SCHERK-SCHWARZ

NS&RR FLUXES

GAUGINO CONDENSATION

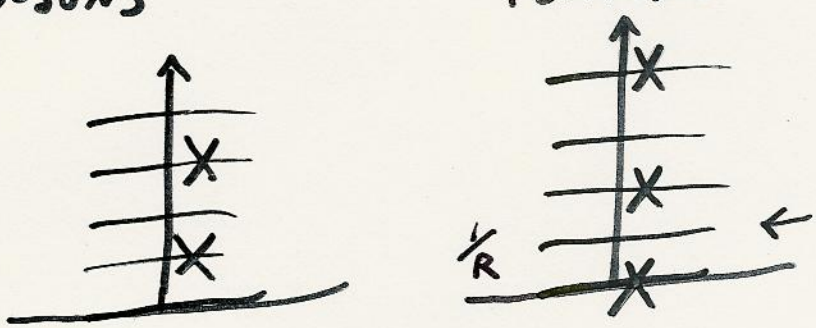
KK MOMENTUM $\frac{n}{R}$

$$Z_2 \sim (-1)^{F} \cdot (-1)^{n}$$

F: FERMION #

BOSONS

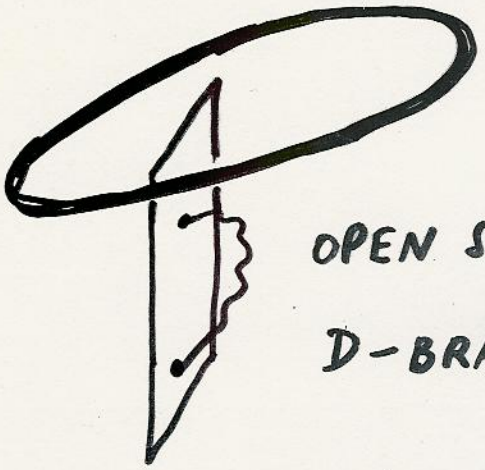
FERMIONS



$$m_{3/2} \sim \frac{1}{R} \ll M_{\text{PLANCK}}$$

SCALARS WILL GET MASSES FROM QUANTUM CORRCTNS

LIGHT FERMIONS



OPEN STRINGS ON D-BRANES

L SS CIRCLE

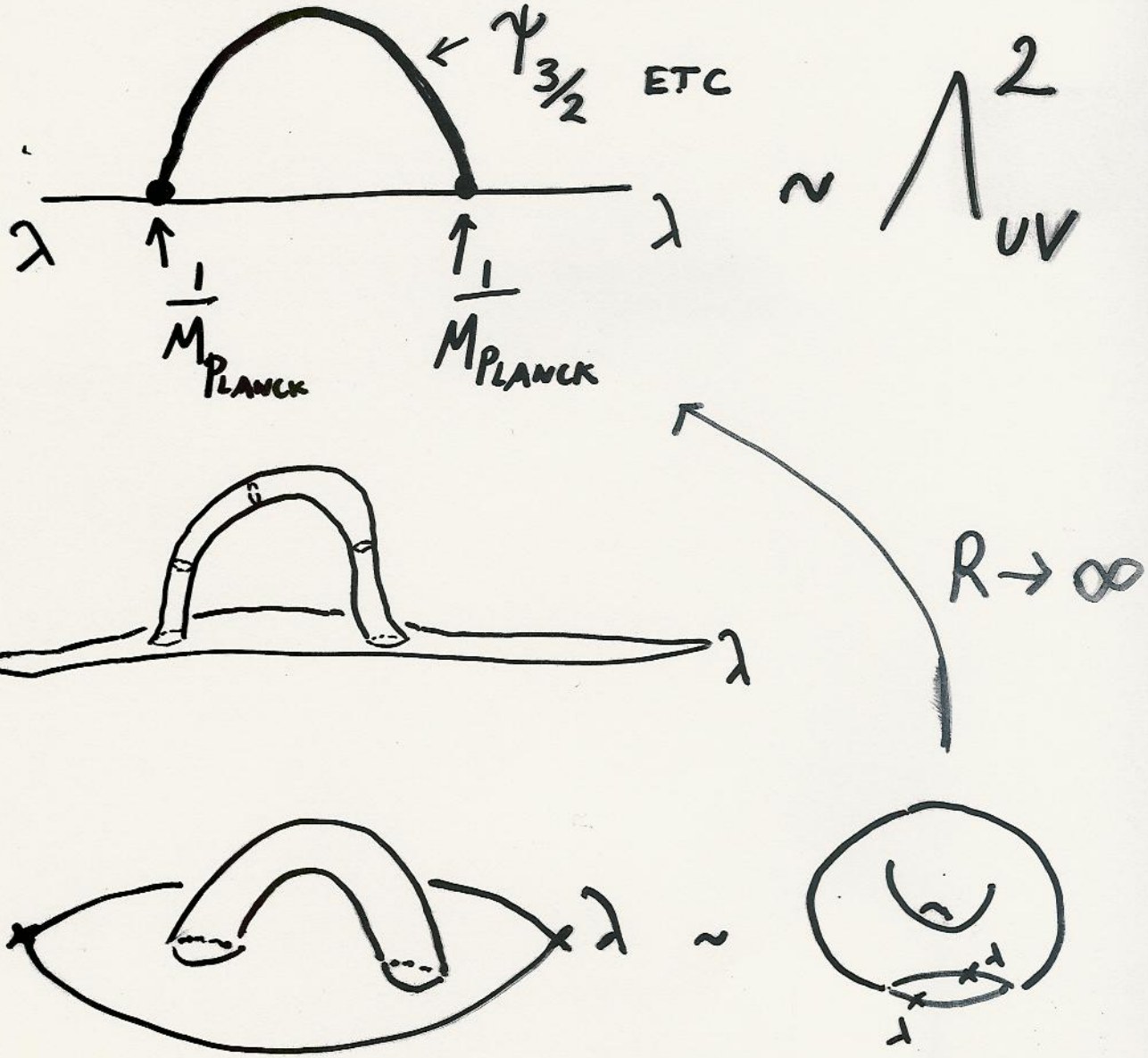
GAUGINOS λ

AT THE CLASSICAL LEVEL,

$$m_\lambda = 0 \ ,$$

HOWEVER...

GRAVITATIONAL MEDIATION



TORUS WITH ONE HOLE (= BOUNDARY)

$$m_\lambda \sim g^4 \frac{m_{3/2}^3}{M_{PLANCK}^2} \Rightarrow \Lambda_{UV} \sim m_{3/2}$$

ON SMOOTH K3

↑ RELATED TO TOPOLOGICAL AMPLITUDES

BUT $m_\lambda \sim e^{-R^2 M_{PLANCK}^2}$ IN THE ORBIFOLD LIMIT

DUE TO DISCRETE SYMMETRIES

hep-th/0402293

So WHERE is ANOMALY MEDIATION

"A ROBUST MECHANISM"

THAT PREDICTS $m_\lambda \sim g^2 \beta$?

IT is NOT THERE. RELATED TO

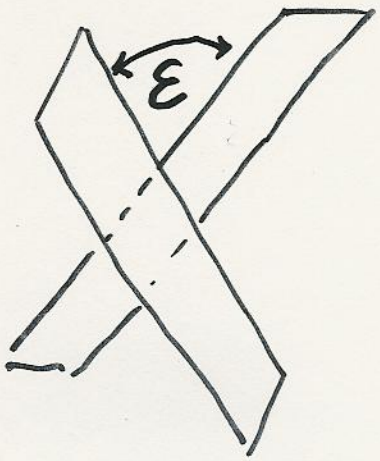
$W \sim$ CONST BUT "NO-SCALE" $V \simeq 0$

IN THIS CALCULABLE SETUP, ANOMALY MEDIATION FAILS TO OPERATE.

DRAW YOUR OWN CONCLUSION...

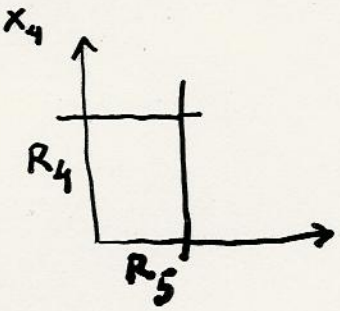
D - TERM BREAKING

$$H \sim \varepsilon$$



MAGNETIZED D-BRANES ⟷ INTERSECTING D-BRANES

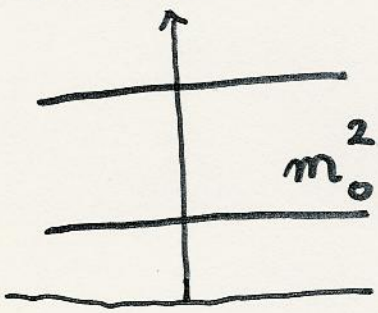
T-DUALITY



$$F_{45} = H = \frac{2\pi m}{R_4 R_5} \leftarrow \text{INTEGER}$$

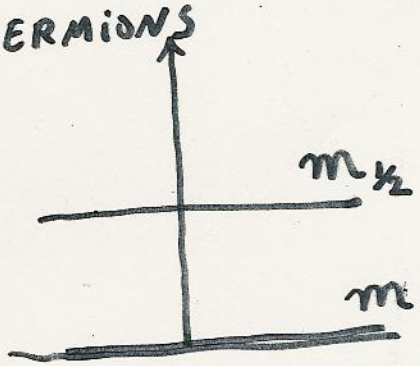
$$[P_4, P_5] \sim iqH \Rightarrow \text{LANDAU LEVELS}$$

BOSONS



$$m_0^2 \sim H \sim D \sim \varepsilon$$

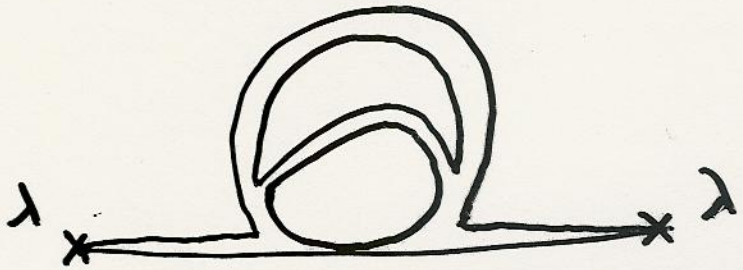
FERMIONS

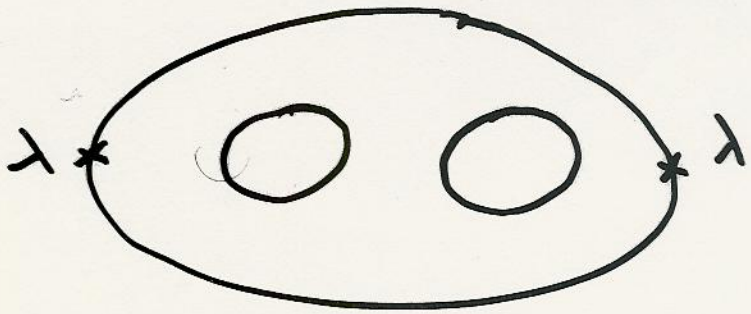


$$\delta\lambda = \epsilon \left(D^{\kappa} + \sigma_{ij} F_{ij} \right)$$

FAYET-ILIOPOULOS TERMS

GAUGE MEDIATION AT TWO LOOPS



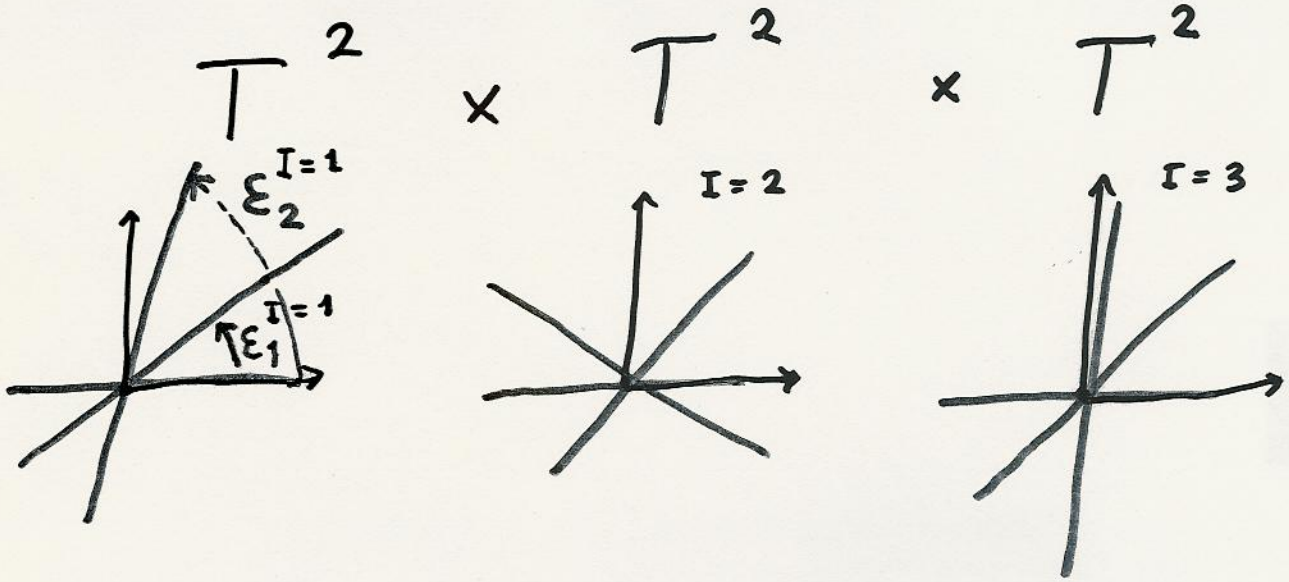


DISK WITH 2 HOLES (GENUS : 0, BOUNDARIES : 3)

$$m_\lambda \sim g^4 \varepsilon^2 \sim \frac{m_0^4}{M_s^3}$$

$* F_{(0,3)}$ (MODULI

TOPOLOGICAL PARTITION FNCTN

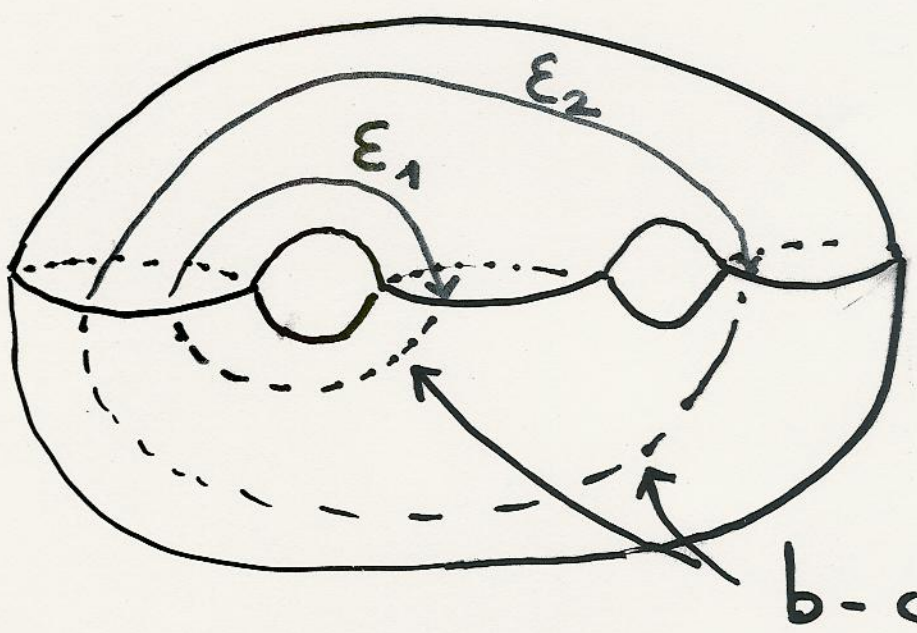


3 STACKS OF D6

ANGLES $\varepsilon_{1,2}^{I=1,2,3}$

IMPLEMENTED AS TWISTS

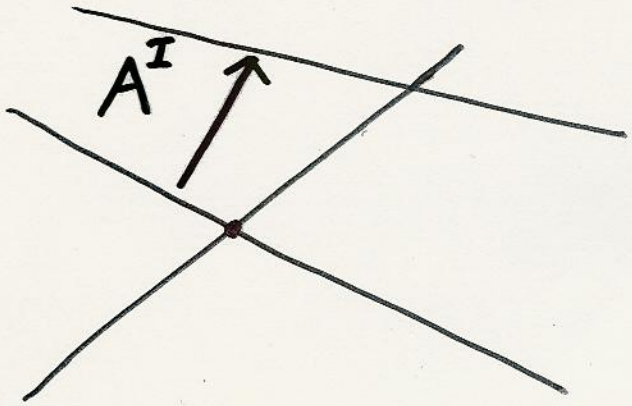
ON THE DOUBLE COVER



$g = 2$

MORE PRECISELY, WILSON LINES

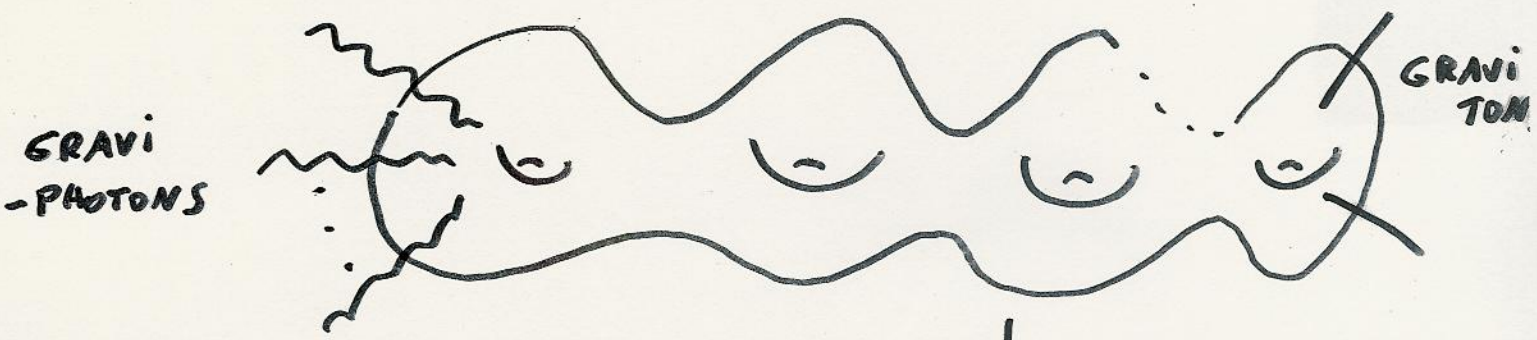
ARE NECESSARY TO BREAK DISCRETE SYMMETRIES.



$F_{(03)}(A^I, \text{MODULI})$

TOPOLOGICAL AMPLITUDES

CLOSED STRINGS

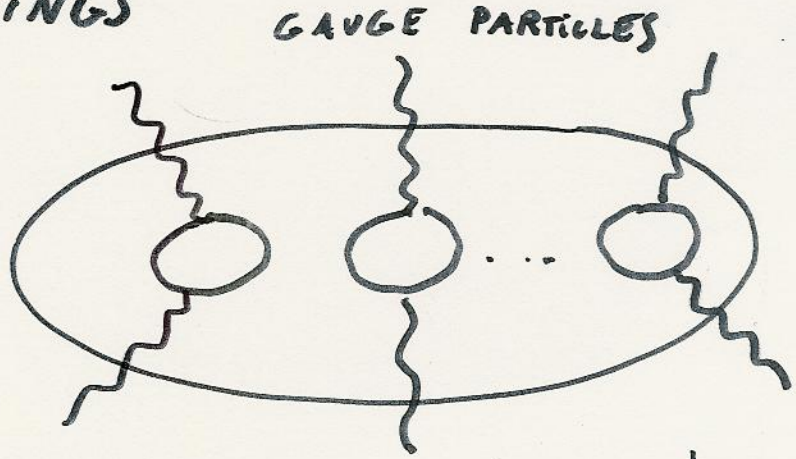


$$F_g (W^2)^g \Big|_{\text{F-TERMS}}$$

g: genus (counts # of holomorphic curves)

W^2: GRAVITATIONAL

OPEN STRINGS



$$F_{(O\,h)} \left(\mathrm{Tr} W^2\right)^{h-1} \Big|_{\text{F-TERMS}}$$

h: holes

W^2: GAUGE

"ALMOST" HOLOMORPHIC (ANOMALIES)

MASS GENERATION:

D - TERM VEVS

$$+\frac{1}{M_S^3} F_{(03)} \underbrace{W^2}_{\langle D^2\rangle} \cdot W^2 \Big|_{F\text{-TERM}} \quad \lambda\lambda$$

$$m_\lambda$$

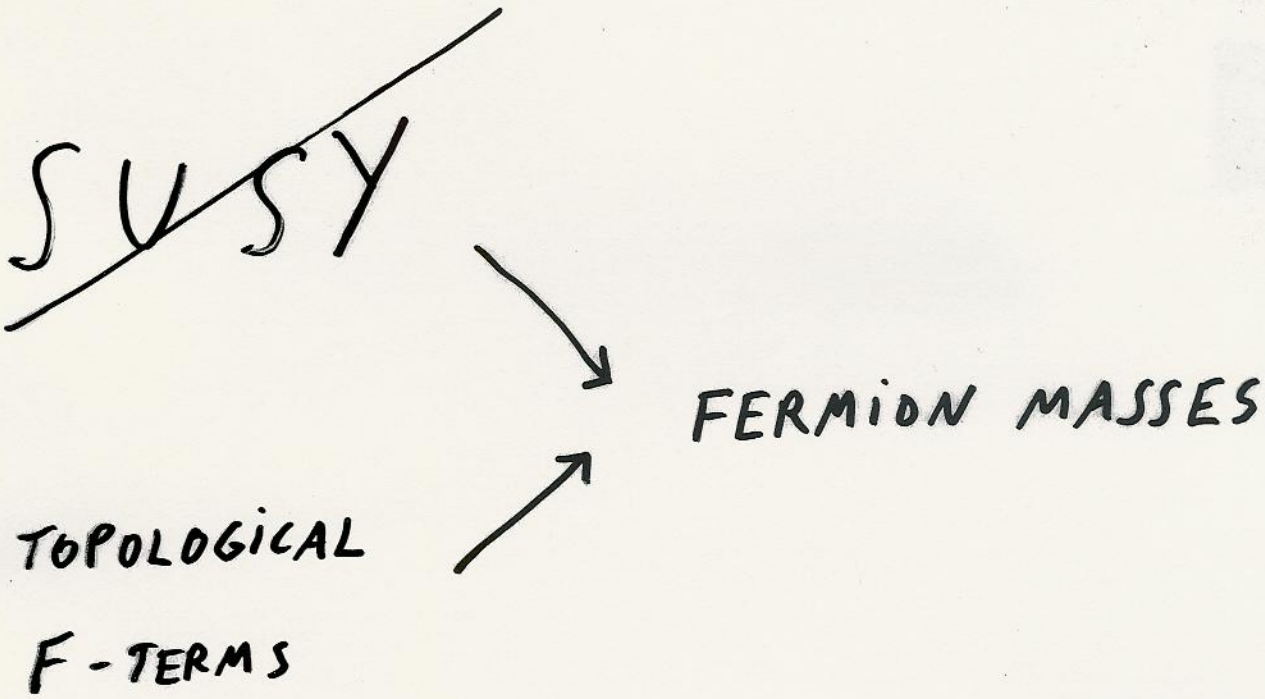
SIMILAR MASSES FOR MODULINOS ETC

$$F_{(02)} \Pi \cdot W^2$$

$\chi\chi$ FROM CHIRAL PROJECTION

$\langle D^2 \rangle$

RELATED BY HOLOMORPHIC ANOMALY EQNS.



SUPERSTRINGS NOT ONLY IMPLEMENT VARIOUS SUSY MEDIATION, BUT ALSO ALLOW MEANINGFUL COMPUTATIONS OF THE MASS SPECTRUM OF ELEMENTARY PARTICLES