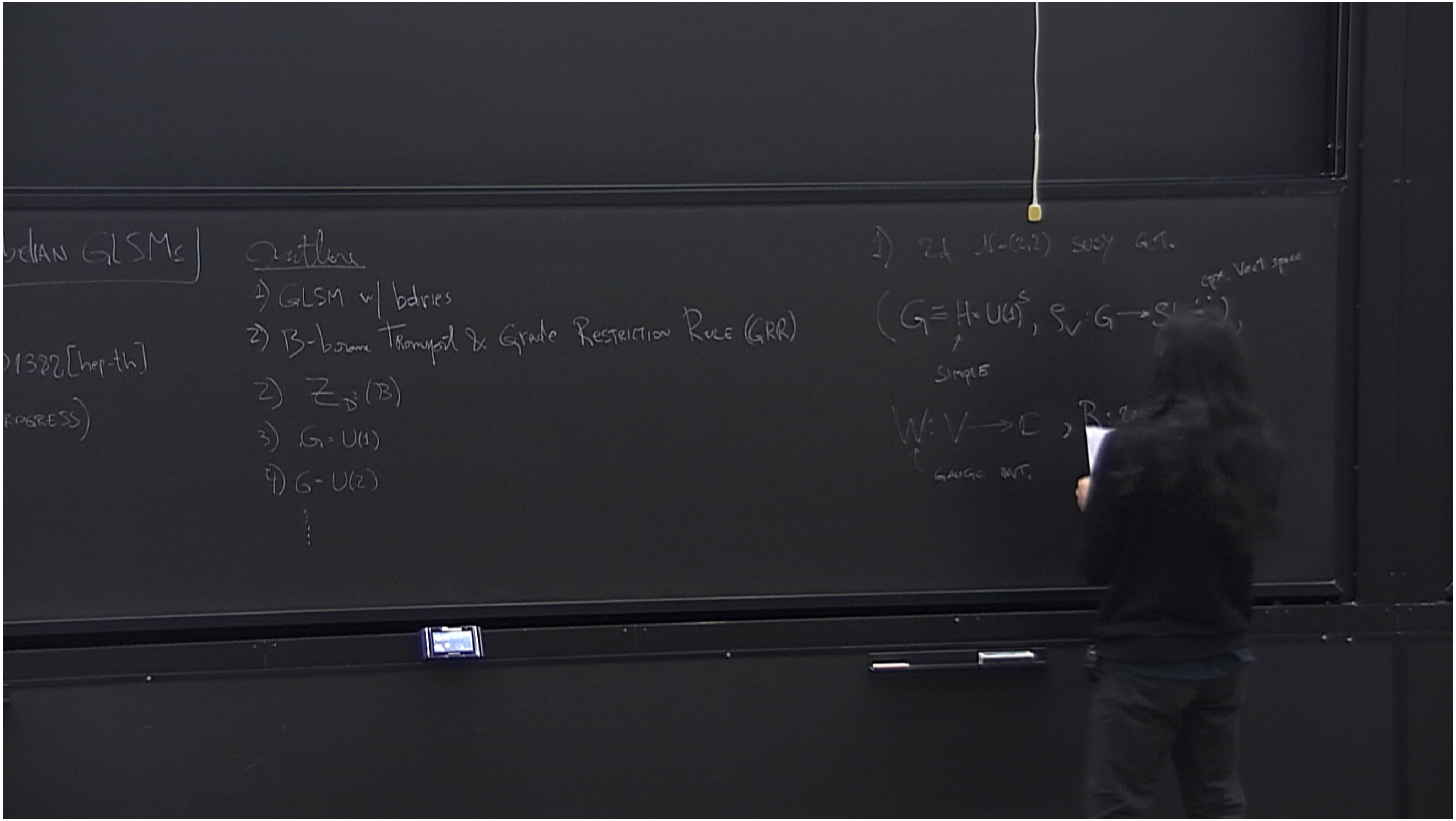
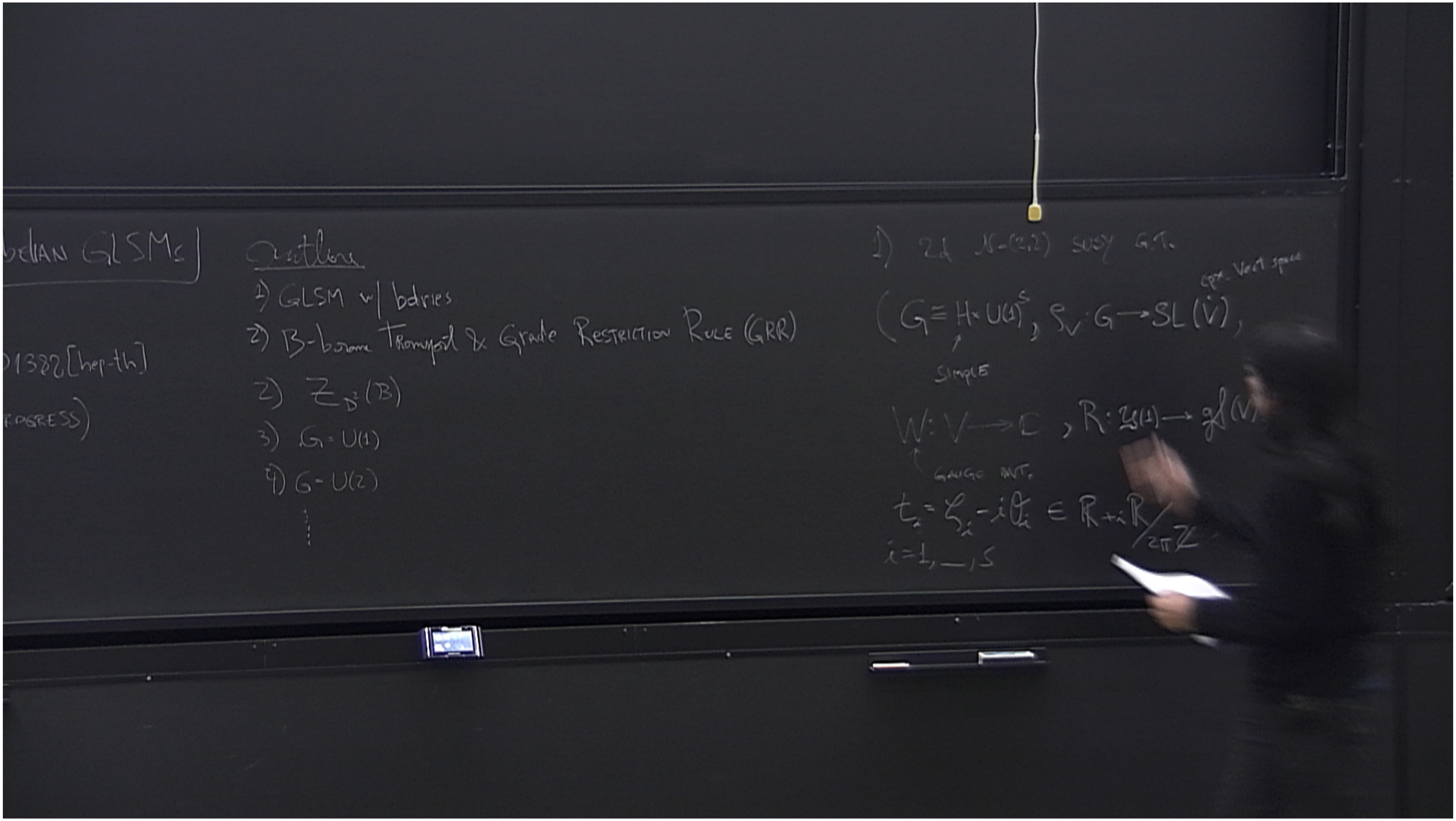
Title: TBA

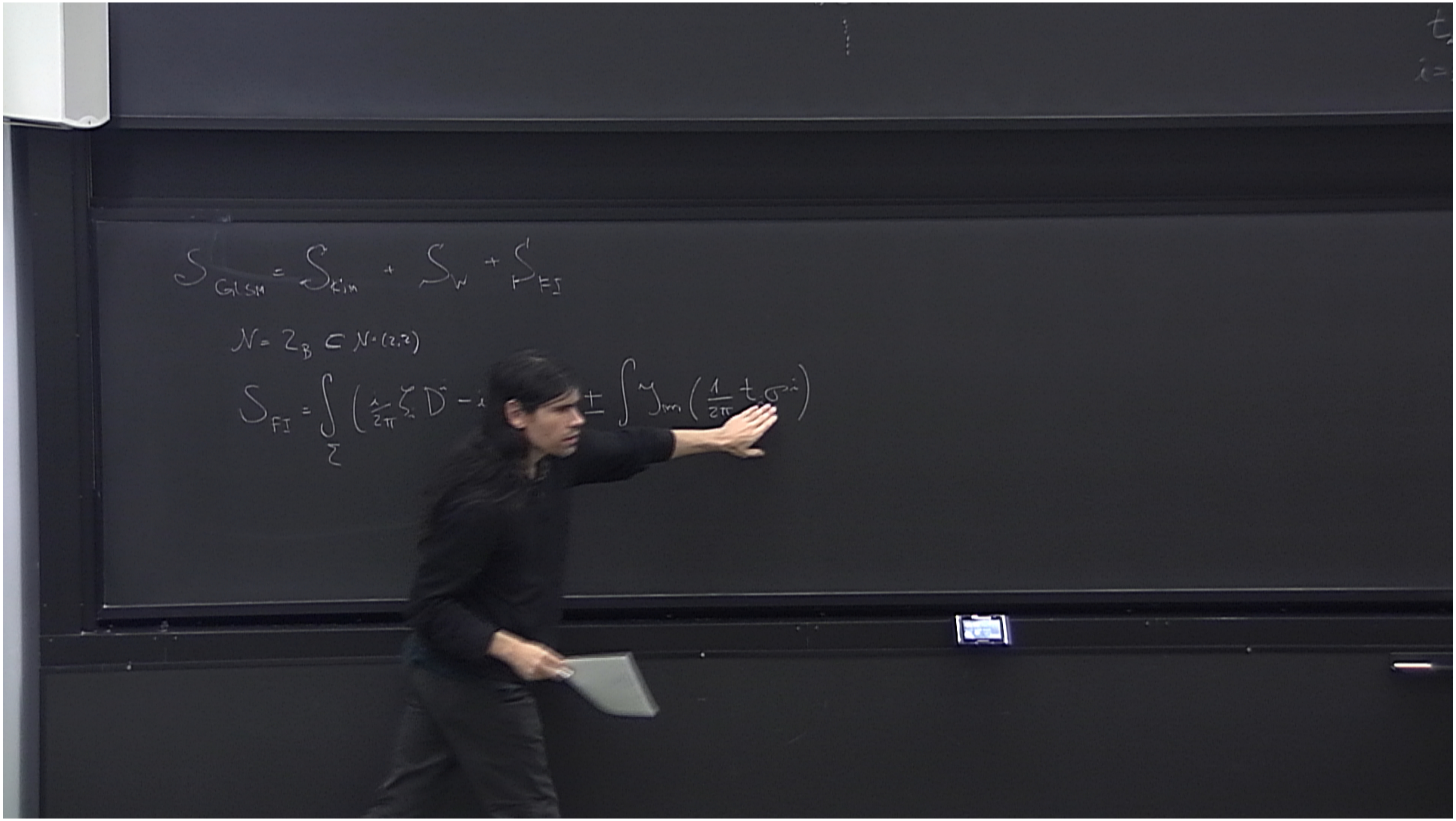
Date: Apr 12, 2016 02:00 PM

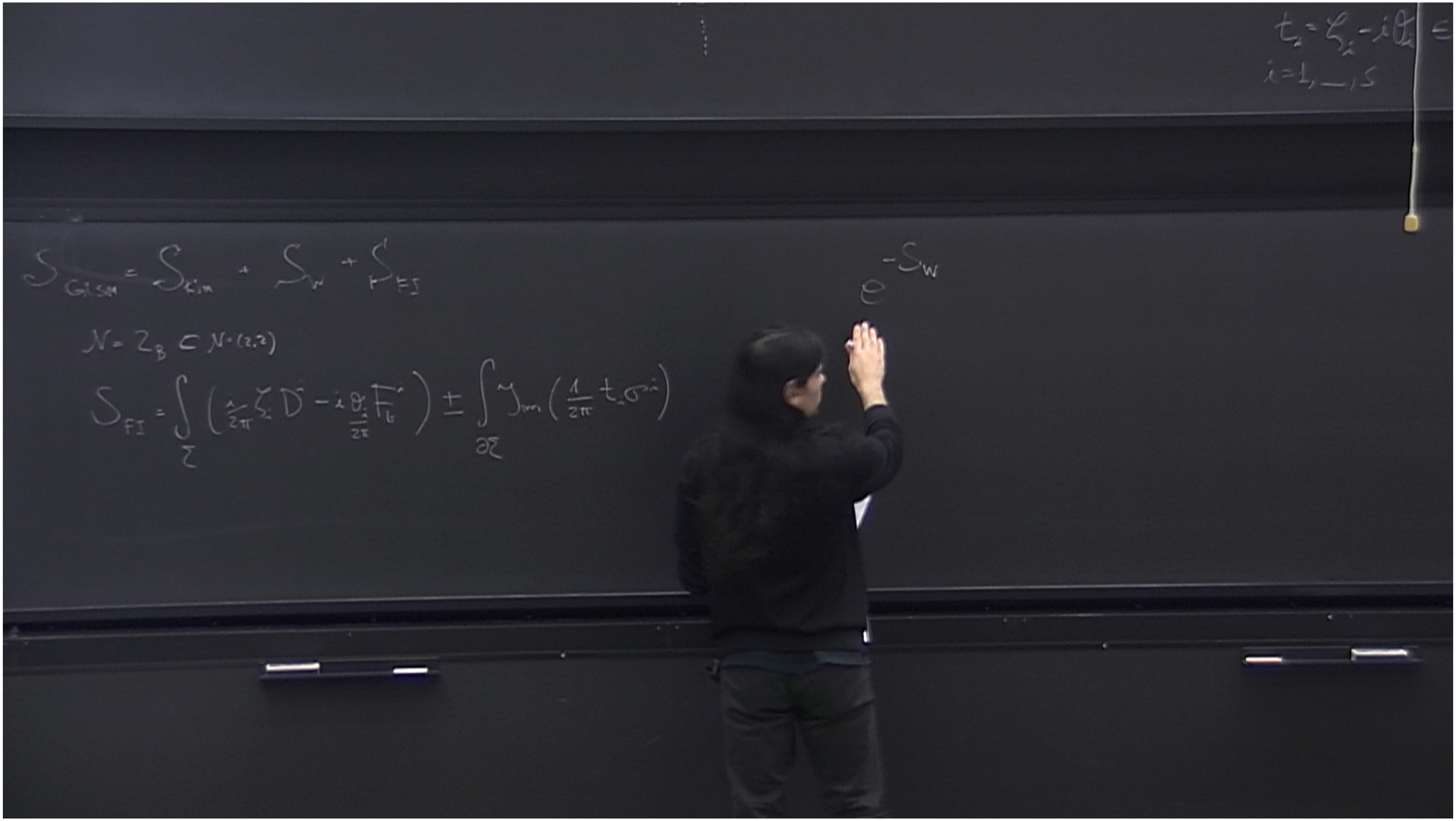
URL: http://pirsa.org/16040054

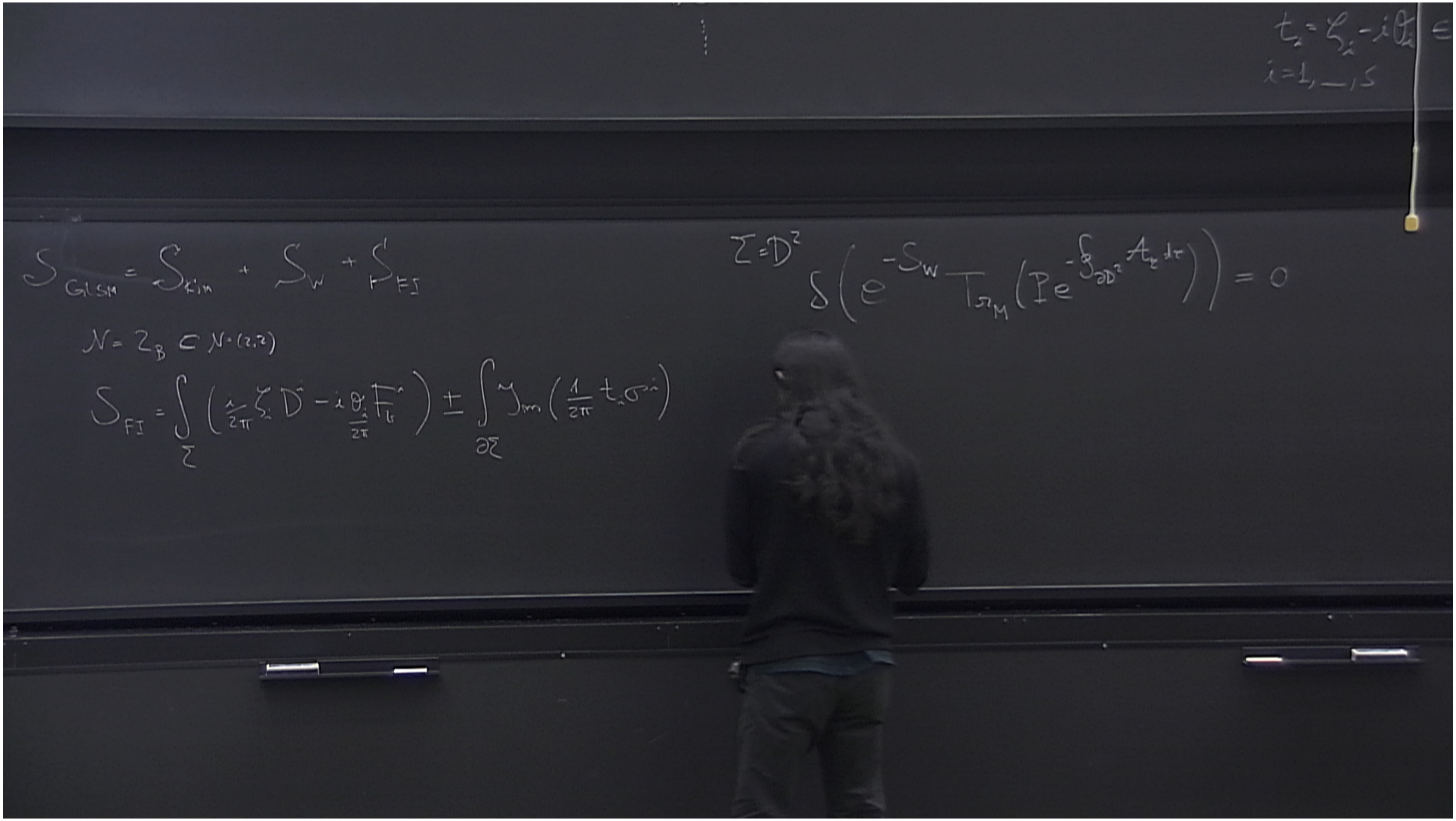
Abstract:

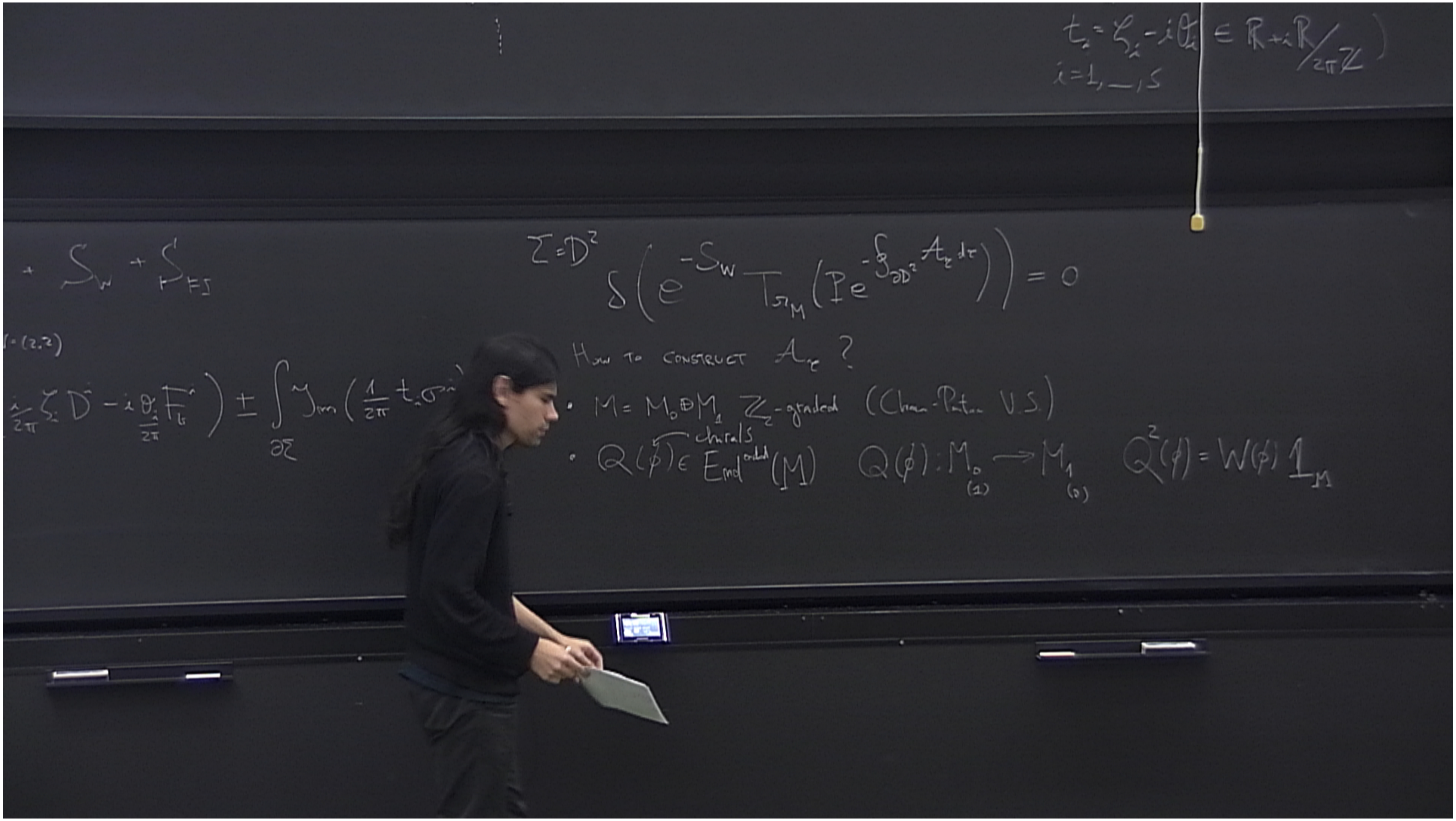

belian GLSMs
Outline
1) GLSM w/ bdries
2) B-brane Transport & Grade Restriction Rule (GRR)
2) Z_{D^2}(B)
3) G = U(1)
4) G = U(2)
1382[hep-th]
1) 2d N=(2,2) SUSY G.T.
cpt. Vect space
(G ≡ H × U(1)^s, ρ_V : G → SL
SIMPLE
W: V → ℂ
GAUGE INV.

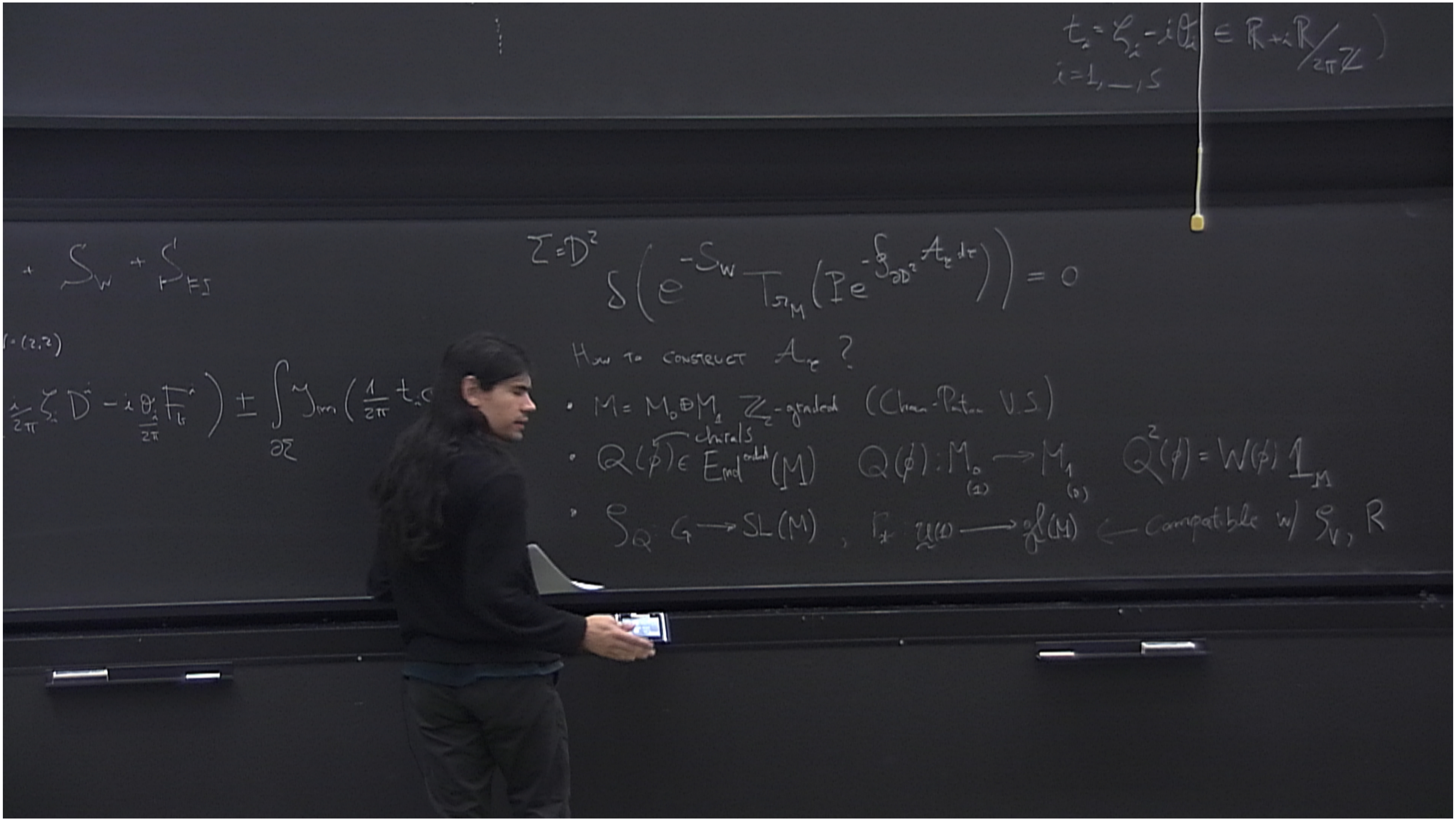

Outline
1) GLSM w/ bdries
2) B-brane Transport & Grade Restriction Rule (GRR)
[hep-th]
1) 2d N=(2,2) SUSY G.T.
SIMPLE
GAUGE INV.
i = 1, ..., s

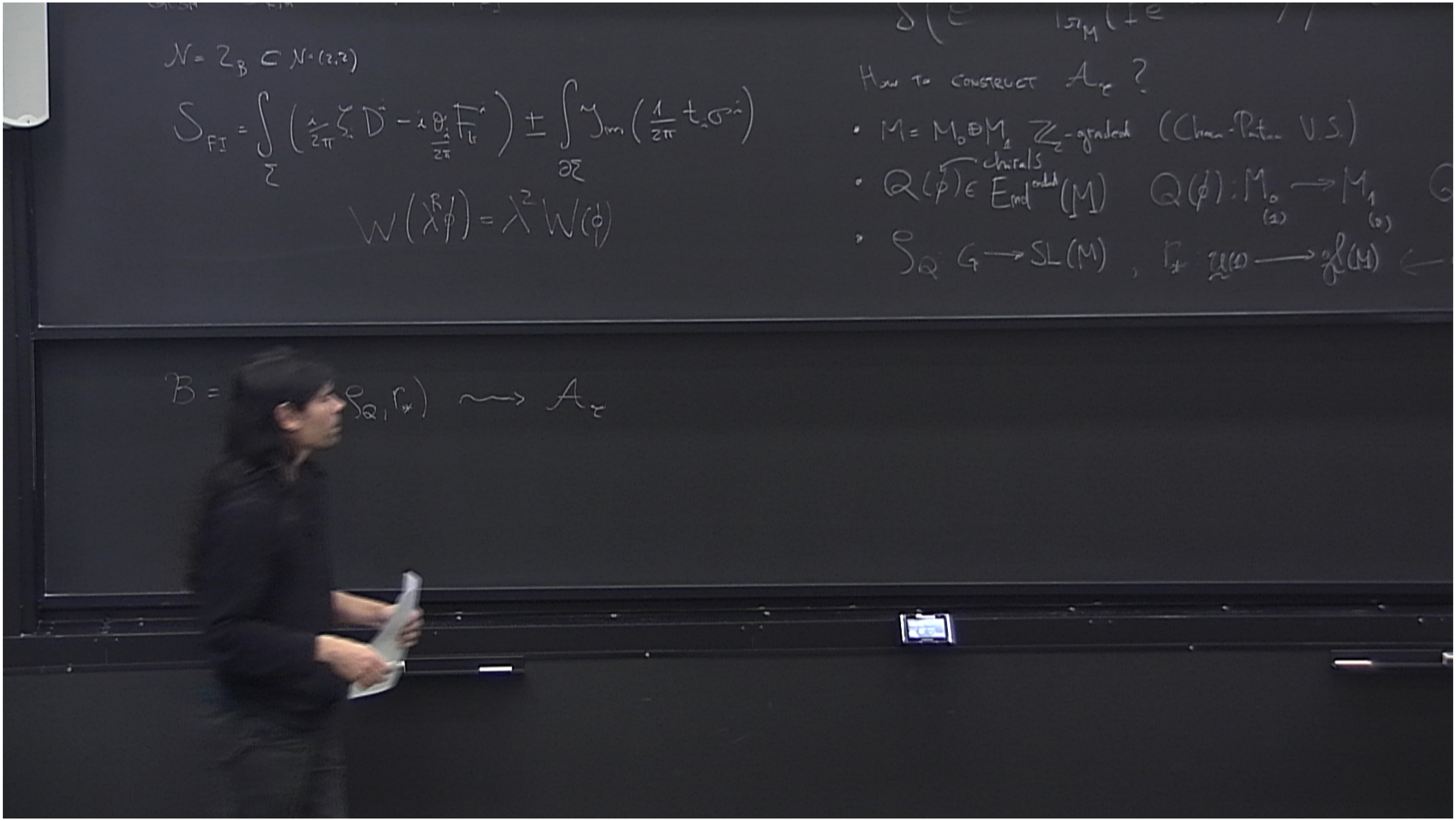

S_GLSM = S_kin + S_W + S_FI
N = 2_B ⊂ N=(2,2)

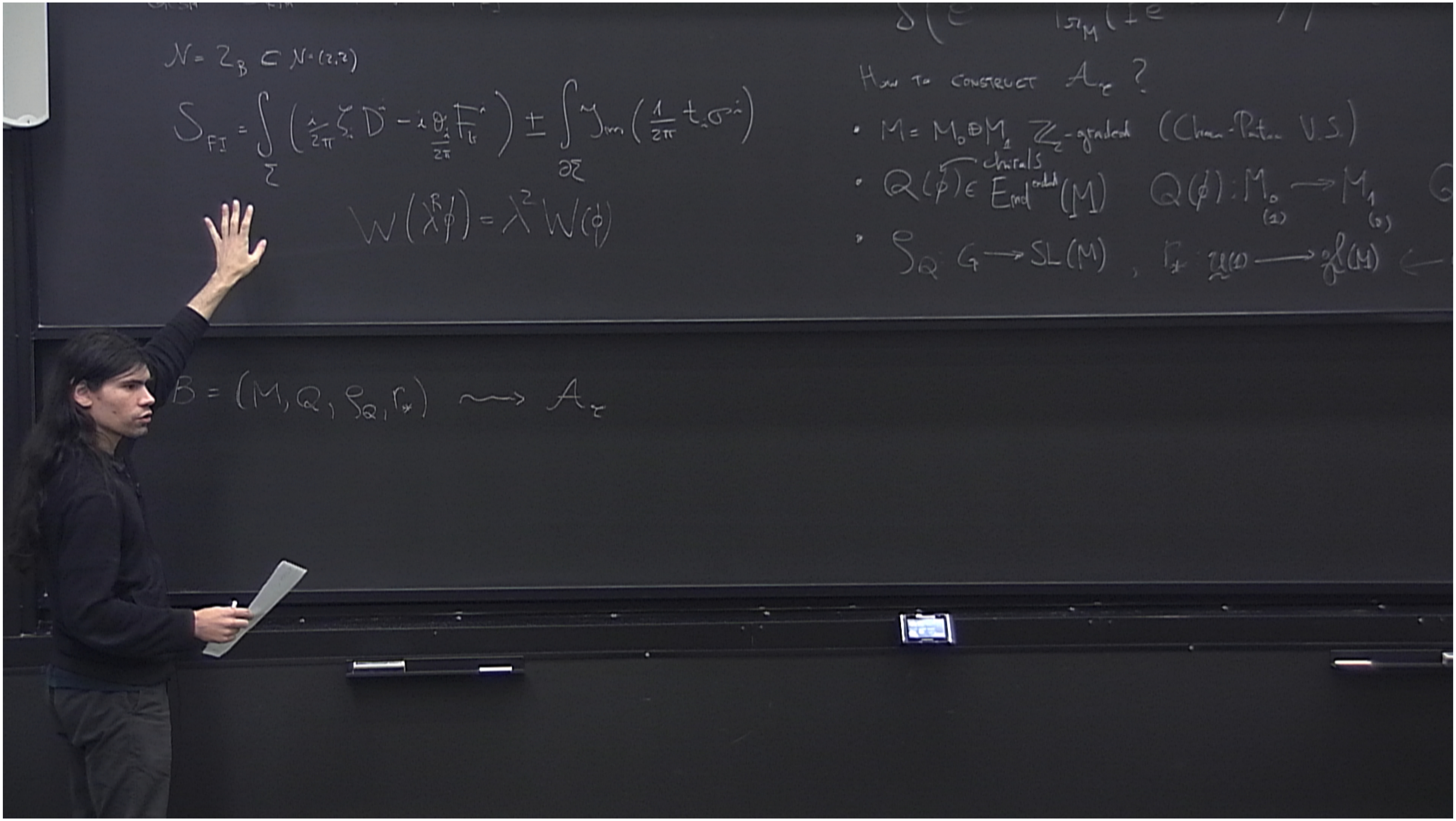

$t_i = \zeta_i - i\theta_i \in$
$i = 1, \ldots, s$
$S_{GLSM} = S_{kin} + S_W + S_{FI}$
$\mathcal{N} = 2_B \subset \mathcal{N} = (2,2)$
$S_{FI} = \int_\Sigma \left( \frac{i}{2\pi} \zeta_i D^i - i \frac{\theta_i}{2\pi} F^i_{\mu\nu} \right) \pm \int_{\partial\Sigma} \gamma_{bdry} \left( \frac{1}{2\pi} t_i \sigma^i \right)$
$e^{-S_W}$

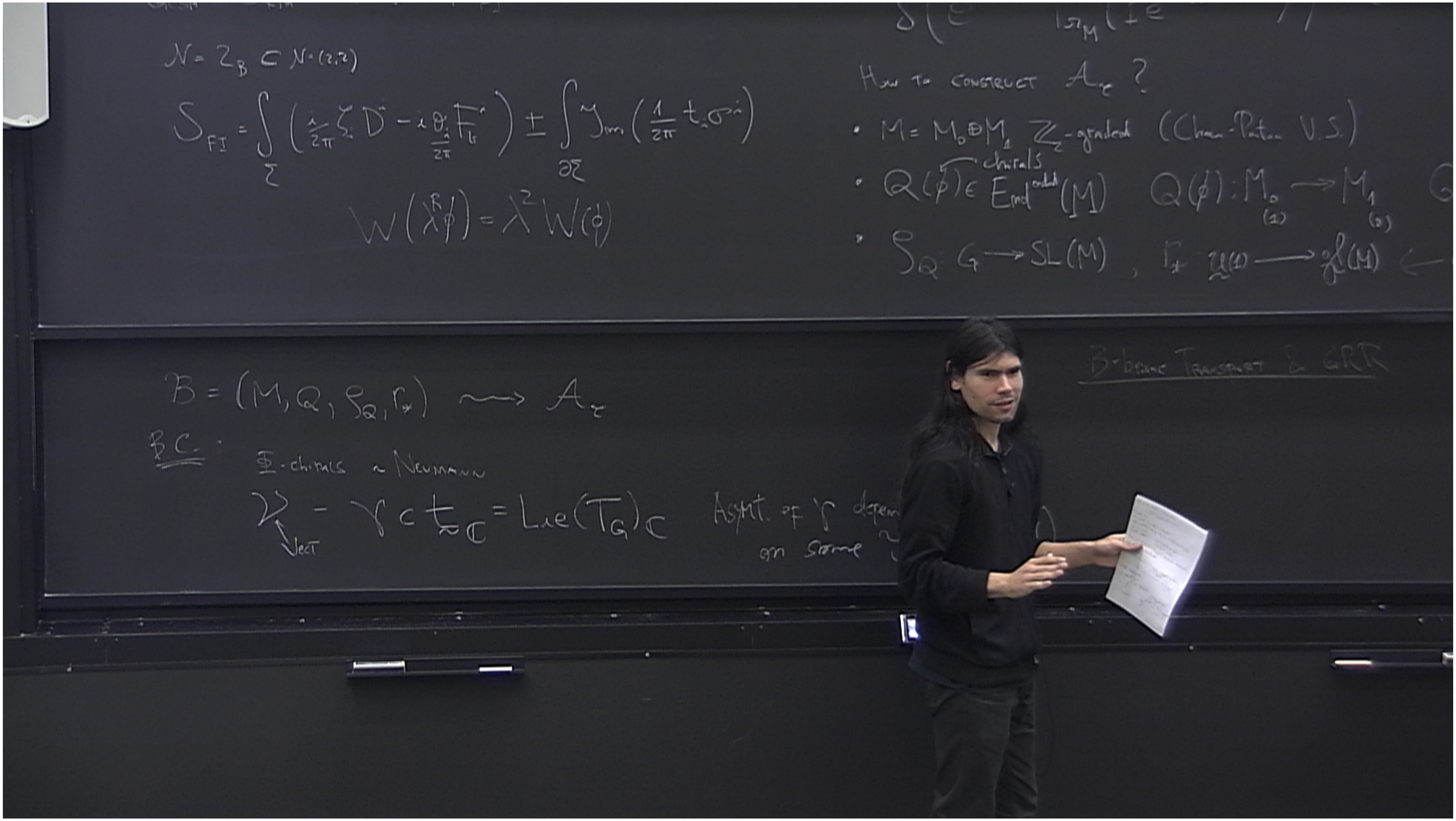

S_GLSM = S_kin + S_W + S_FI
N = 2_B ⊂ N = (2,2)
Σ = D²
δ(e^{-S_W} Tr_M (P e^{-∮_∂D² A_τ dτ})) = 0
i = 1, ..., s

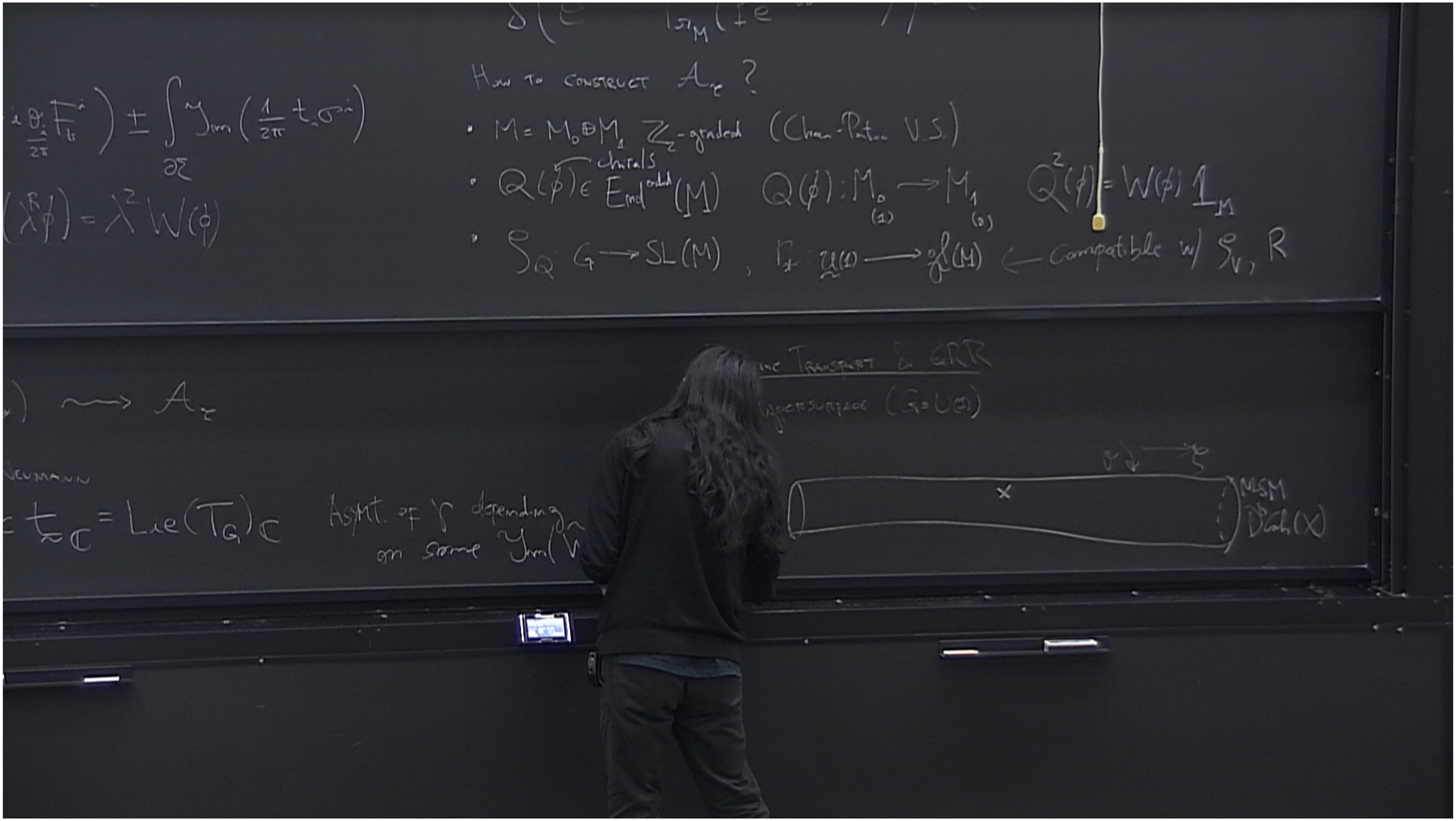

How to construct
M = M0 ⊕ M1 Z2-graded (Chan-Paton V.S.)
chirals
Q(φ) ∈ End(M) Q(φ) : M0 → M1
Q²(φ) = W(φ) 1M
i = 1, ..., S


t_i = ζ_i − iθ_i ∈ ℝ + iℝ/2πℤ
i = 1, …, s
+ S_W + S_FI
Σ = D²
δ(e^{−S_W} Tr_M(P e^{−∮_{∂D²} A_τ dτ})) = 0
How to construct A_τ ?
• M = M_0 ⊕ M_1 ℤ_2-graded (Chan-Paton V.S.)
chirals
• Q(φ) ∈ End^odd(M) Q(φ): M_0 → M_1 Q²(φ) = W(φ) 1_M
• ρ_Q G → SL(M), R: u(1) → gl(M) ← Compatible w/ ρ_V, R


How to construct $A_\tau$ ?
$M = M_0 \oplus M_1$ $\mathbb{Z}_2$-graded (Chan-Paton V.S.)
$W(\lambda^R \phi) = \lambda^2 W(\phi)$


N = 2_B ⊂ N = (2,2)
S_FI = ∫_Σ ( 1/2π ζ_a D^a − i θ_a/2π F_12^a ) ± ∫_∂Σ γ_m ( 1/2π t_a σ^a )
W(λ^R φ) = λ^2 W(φ)
B = (M, Q, ρ_Q, r_*) ⟿ A_τ
How to construct A_τ ?
• M = M_0 ⊕ M_1 Z_2-graded (Chan-Paton V.S.)
chirals
• Q(φ) ∈ End^odd(M) Q(φ): M_0 → M_1
• ρ_Q: G → SL(M), r_*: u(1) → gl(M)


N = 2_B ⊂ N = (2,2)
S_FI = ∫_Σ ( 1/2π ζ D − i θ/2π F ) ± ∫_∂Σ γ_m ( 1/2π t σ )
W(λ^R φ) = λ^2 W(φ)
How to construct A_τ ?
• M = M_0 ⊕ M_1 Z_2-graded (Chan-Paton V.S.)
• Q(φ) ∈ End^odd(M) Q(φ) : M_0 → M_1
chirals
• ρ_Q : G → SL(M) , r_* : u(1) → gl(M)
B = (M, Q, ρ_Q, r_*) ⟶ A_τ
B.C. :
Φ-chirals ~ Neumann
Vect
Asymt. of γ
on Stokes
B-brane Transport & GRR


How to construct $A_\gamma$ ?
• $M = M_0 \oplus M_1$ $\mathbb{Z}_2$-graded (Chan-Paton V.S.)
chirals
• $Q(\phi) \in End^{odd}(M)$ $Q(\phi): M_0 \to M_1$ $Q^2(\phi) = W(\phi) 1_M$
• $\rho_Q: G \to SL(M)$ , $r_*: \mathfrak{u}(1) \to \mathfrak{gl}(M)$ ← Compatible w/ $\rho_V$, R
$\rightsquigarrow A_\gamma$
Neumann
$= \mathfrak{t}_{\mathbb{C}} = Lie(T_G)_{\mathbb{C}}$
Asymt. of $\gamma$ depending on some $\gamma_{rm}$
Transport & GRR
(G = U(1))
NLSM
$D^b Coh(X)$

$\delta(\Sigma \ldots \mathrm{Tr}_M(Pe \ldots))$

$i \frac{\theta_i}{2\pi} F_{t_i}) \pm \int_{\partial\Sigma} \gamma_{im}\left(\frac{1}{2\pi} t_a \sigma^{a}\right)$

$(\lambda^R \phi) = \lambda^2 W(\phi)$

How to construct $\mathcal{A}_\gamma$ ?

- $M = M_0 \oplus M_1$ $\mathbb{Z}_2$-graded (Chan-Paton V.S.)
- $Q(\phi) \in \mathrm{End}^{odd}(M)$ (chirals) $\quad Q(\phi): M_{0\,(1)} \to M_{1\,(0)} \quad Q^2(\phi) = W(\phi)\, 1_M$
- $\rho_Q: G \to SL(M)$, $r_*: \mathfrak{u}(1) \to \mathfrak{gl}(M)$ ← Compatible w/ $\rho_V$, R

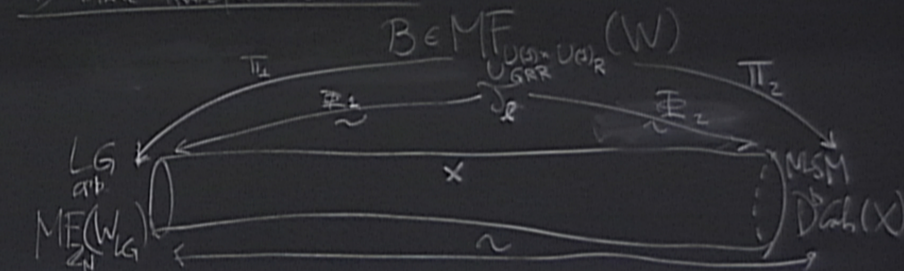
$) \rightsquigarrow \mathcal{A}_\gamma$

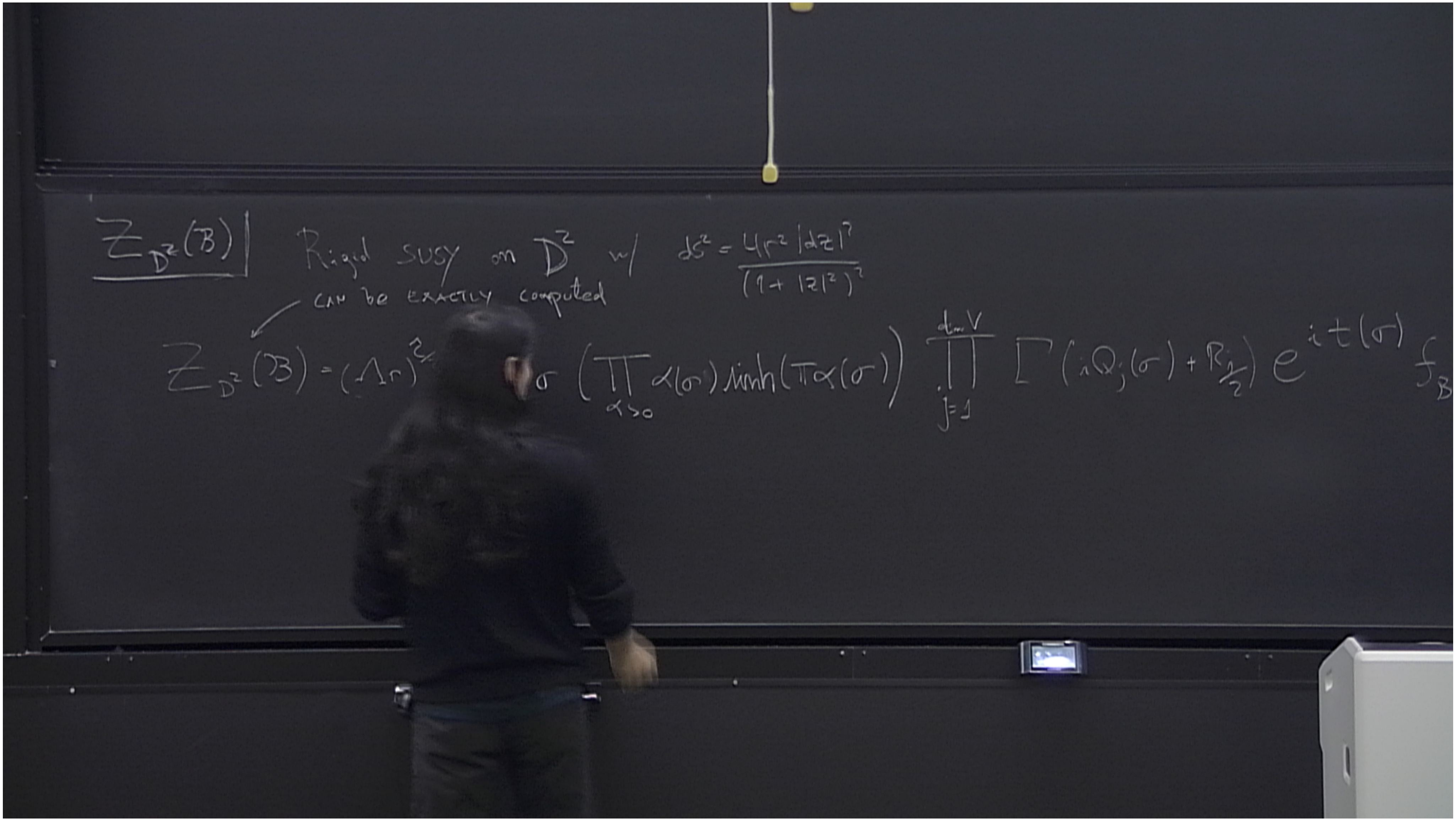
Neumann

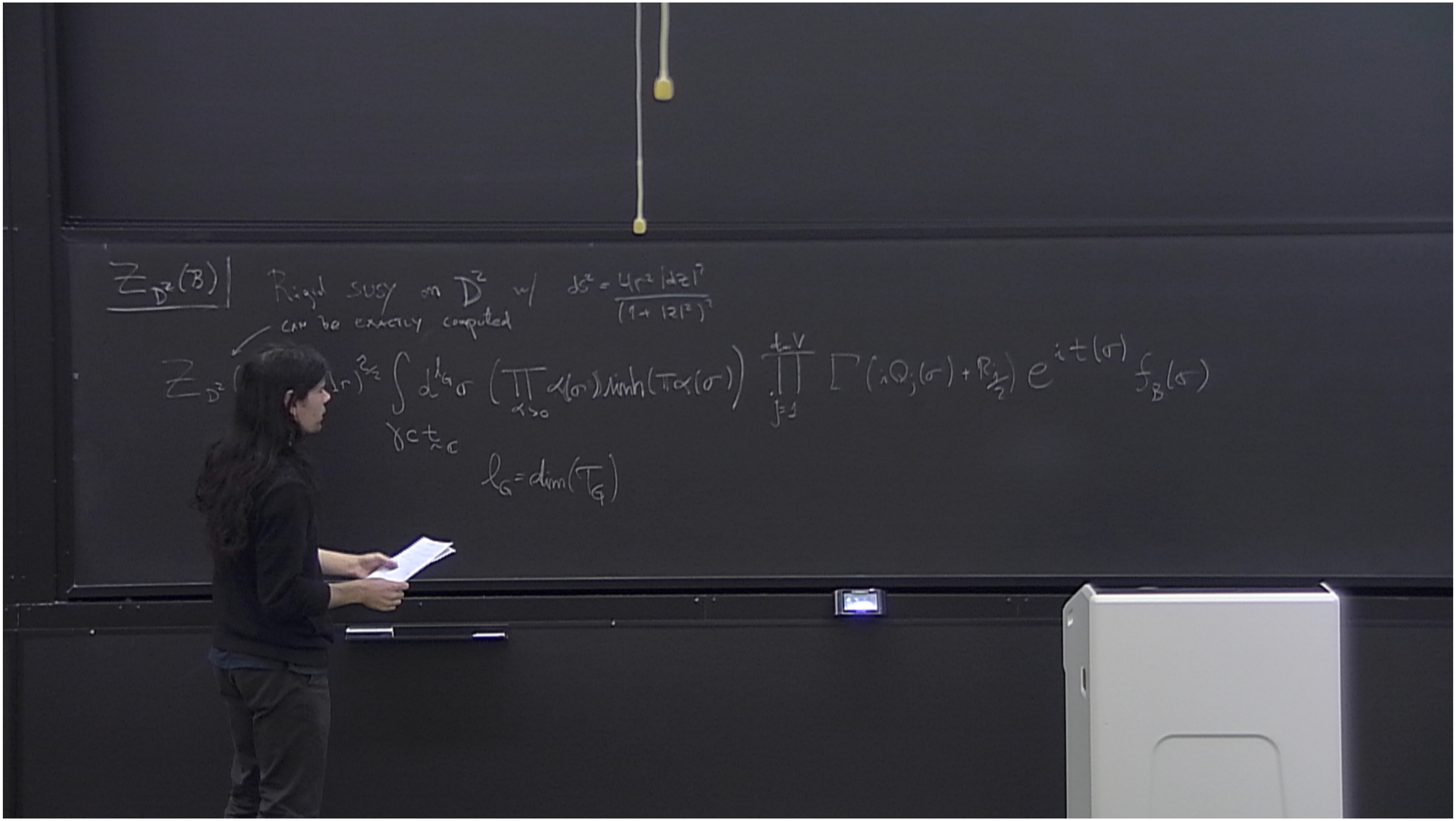
$t_{\mathbb{C}} = \mathrm{Lie}(T_G)_{\mathbb{C}}$

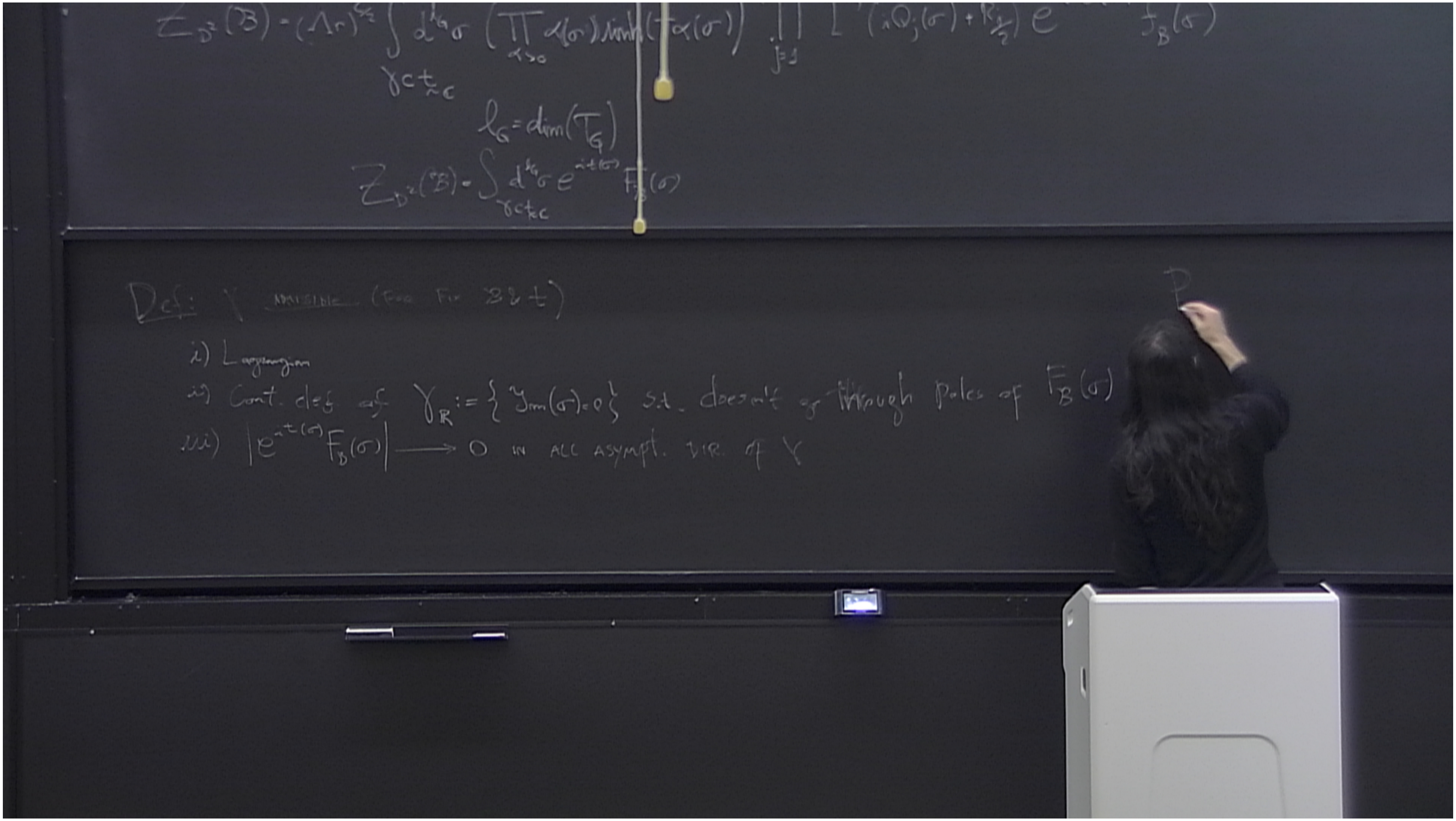
Asympt. of $\gamma$ depending on some $\gamma_{im}(\widetilde{W}_{eff}[B])$

B-brane Transport & GRR

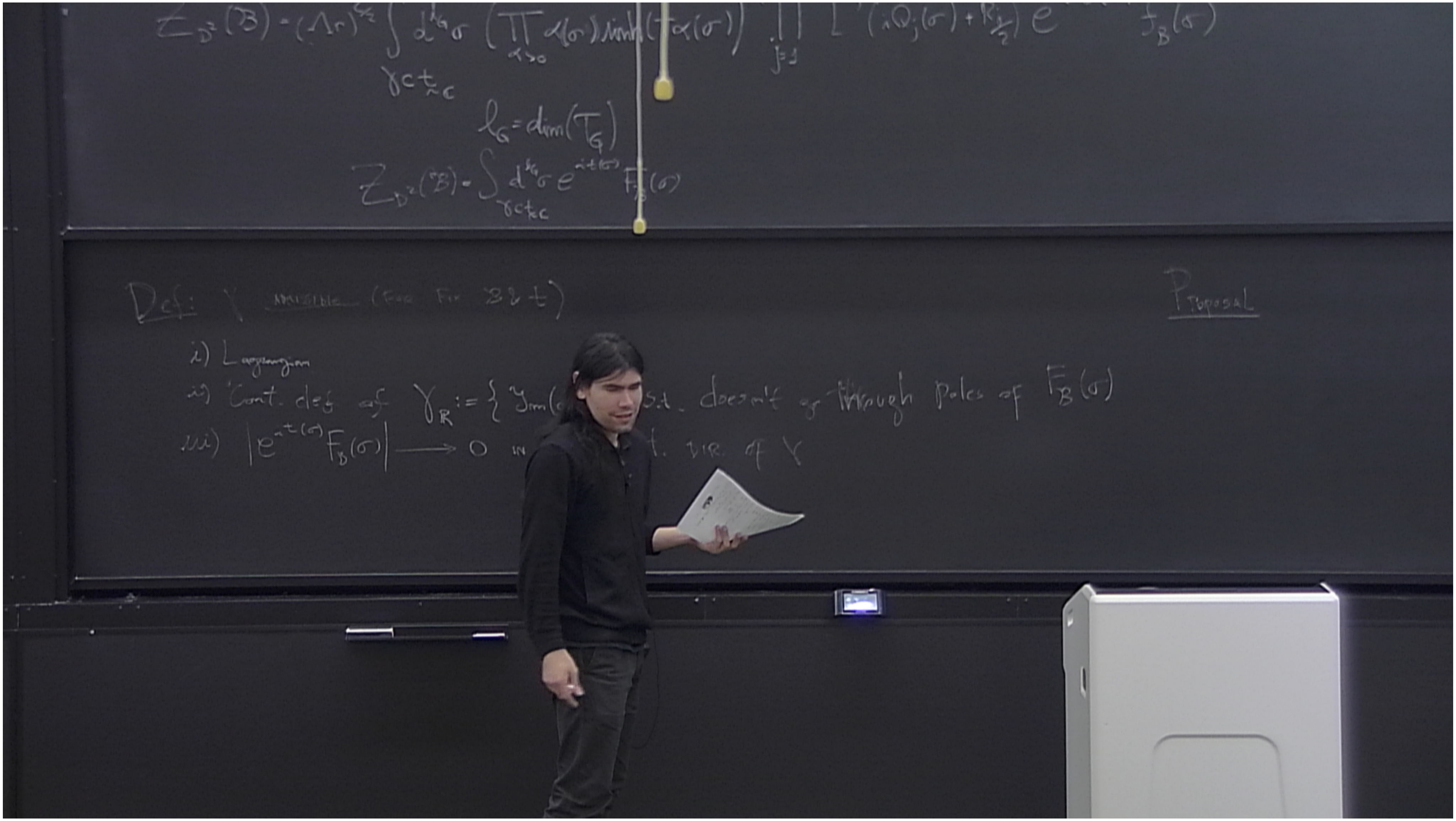


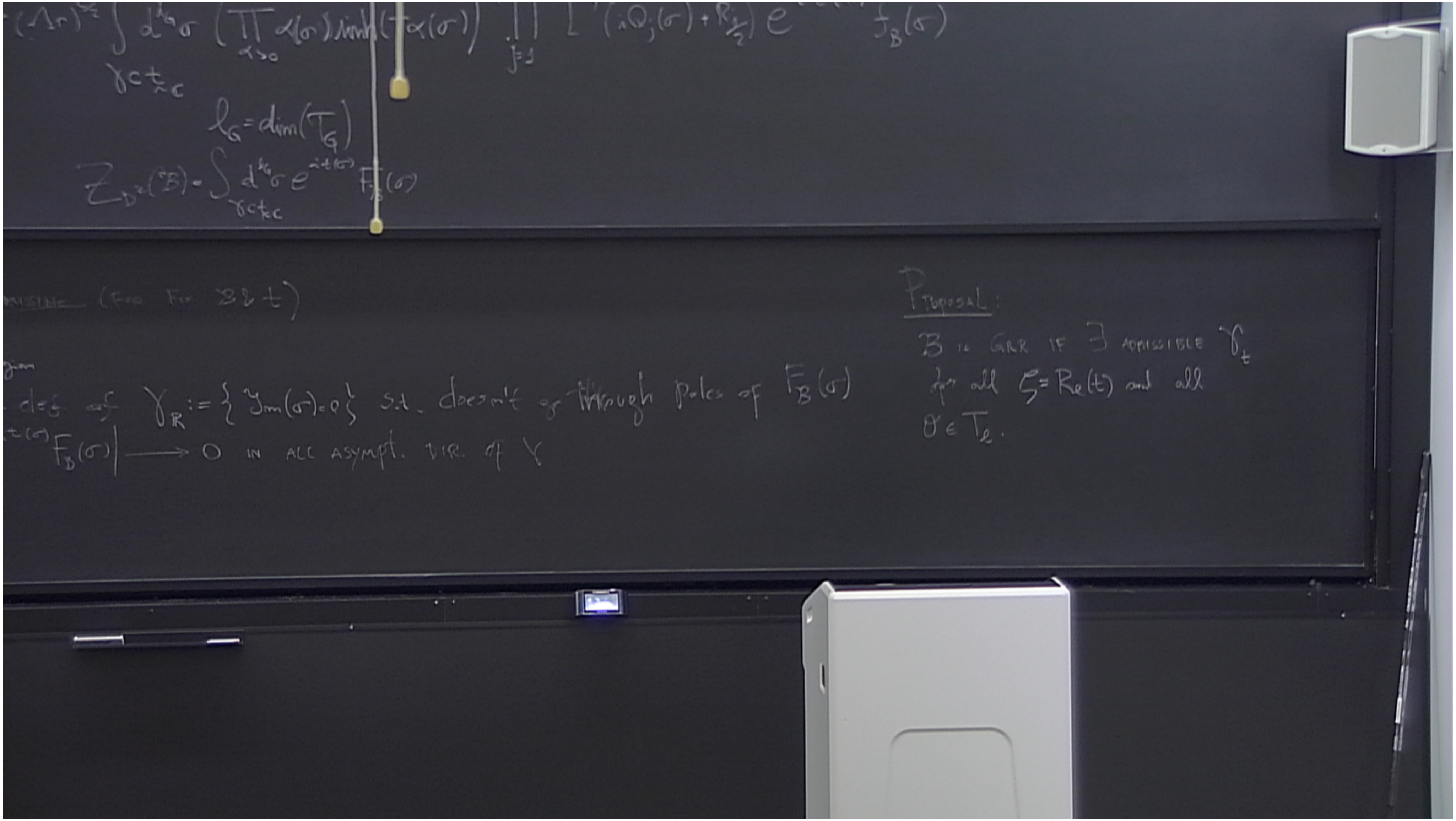

Z_{D^2}(B)
Rigid SUSY on D^2 w/ ds^2 = 4r^2 |dz|^2 / (1+|z|^2)^2
CAN be EXACTLY computed

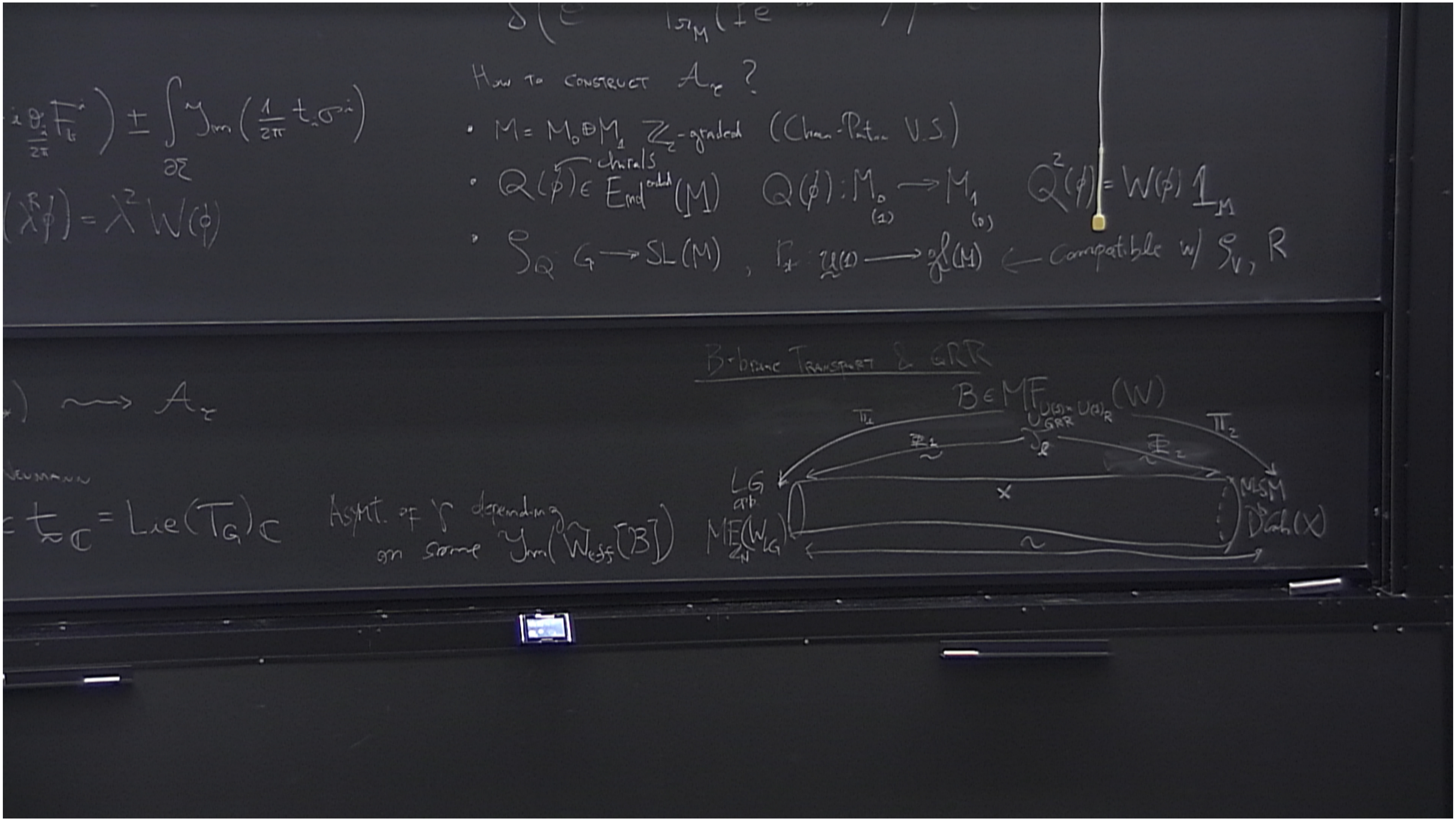

Rigid SUSY on D² w/
can be exactly computed
γ ⊂ t_C
l_G = dim(T_G)

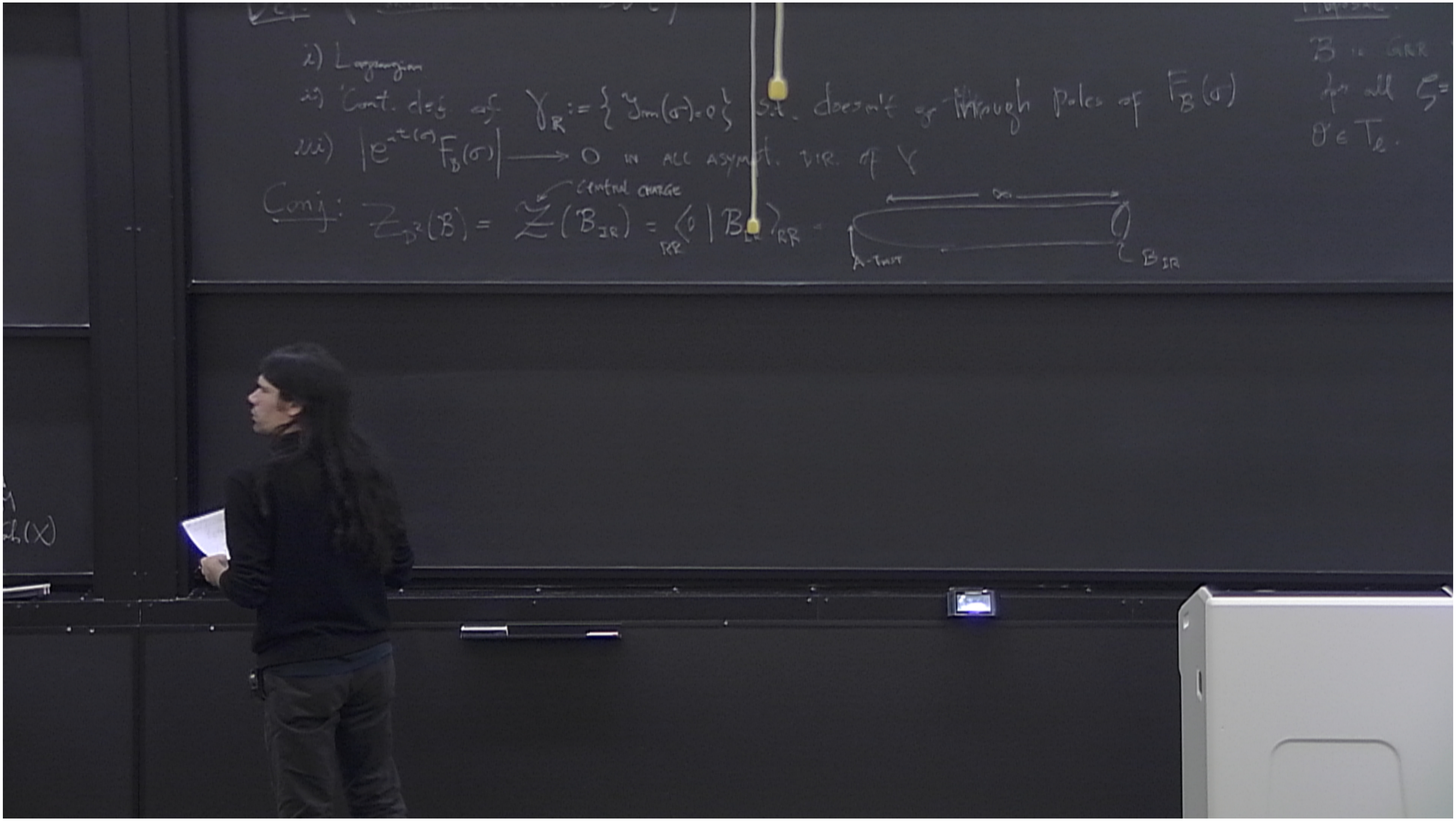


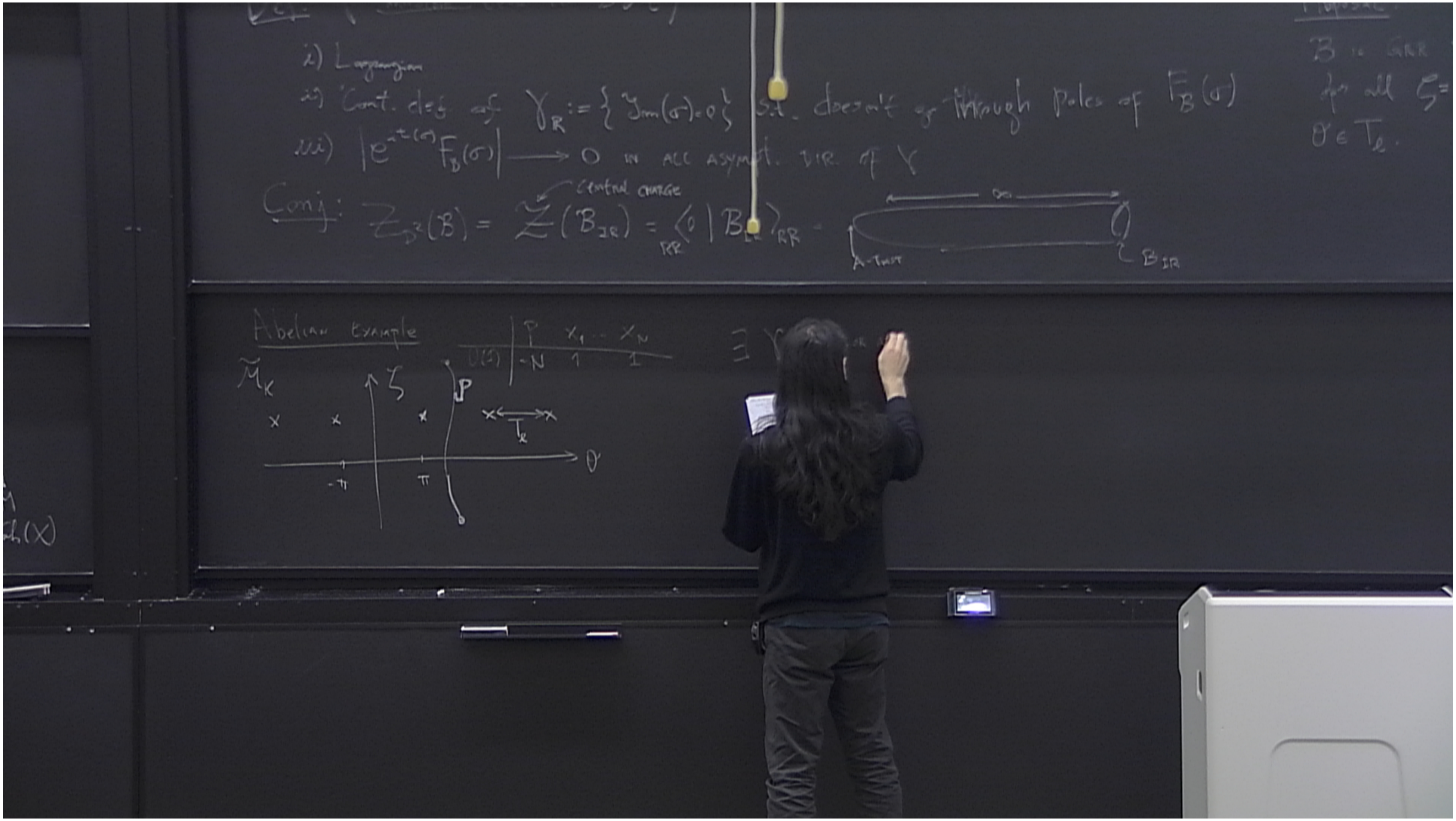
l_G = dim(T_G)
Z_{D²}(B) = ∫_{γ⊂t_C} d^{l_G}σ e^{-it(σ)} F_B(σ)
Def: γ ADMISSIBLE (FOR FIX B & t)
i) Lagrangian
ii) Cont. def of γ_R := { Im(σ)=0 } s.t. doesn't go through poles of F_B(σ)
iii) |e^{-it(σ)} F_B(σ)| → 0 IN ALL ASYMPT. DIR. OF γ

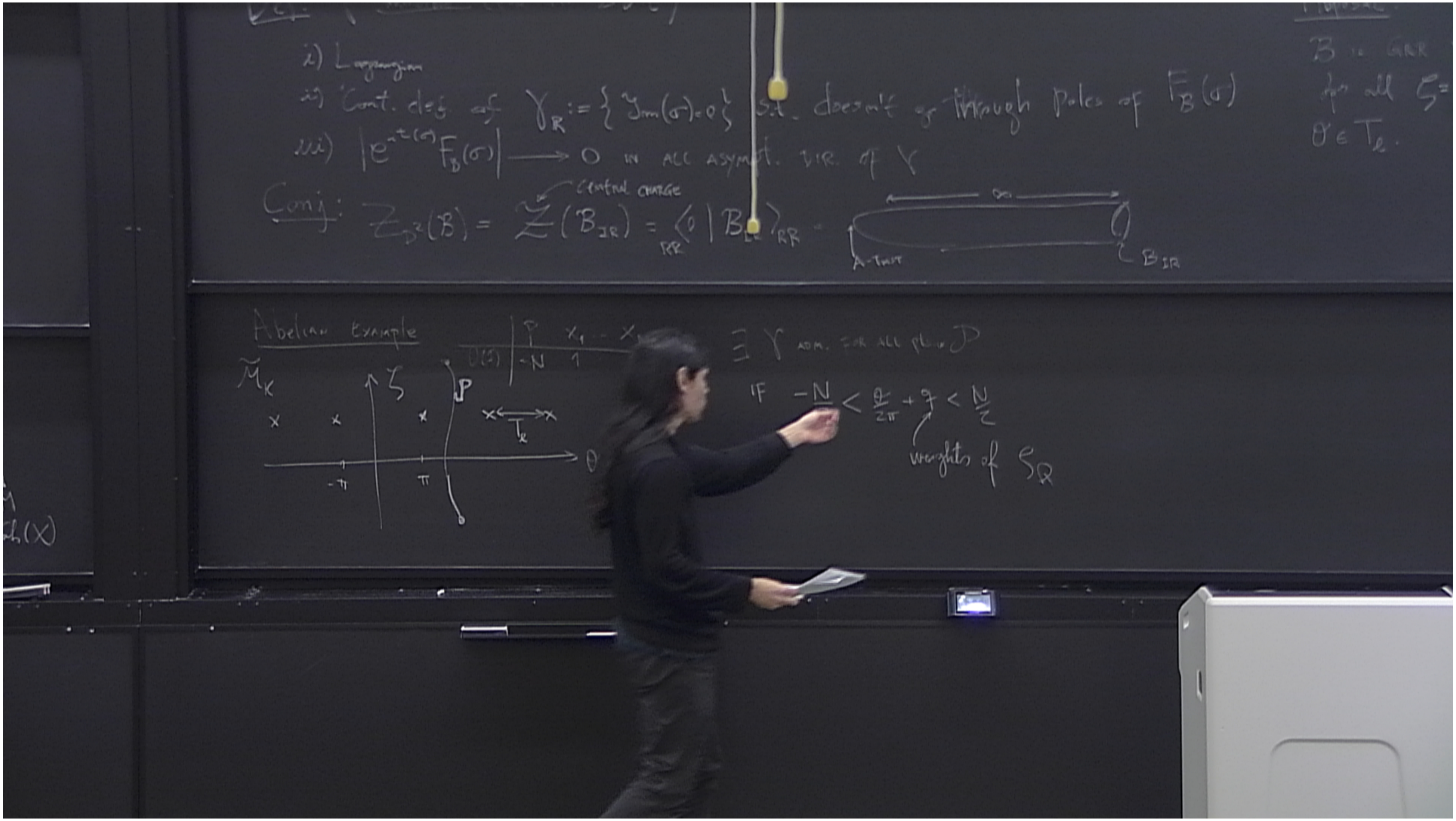

l_G = dim(T_G)
Def: γ ADMISSIBLE (FOR FIX B & t)
PROPOSAL
i) Lagrangian
ii) Cont. def of γ_R := {
s.t. doesn't go through poles of F_B(σ)
iii) |e^{-it(σ)} F_B(σ)| → 0
DIR. of γ

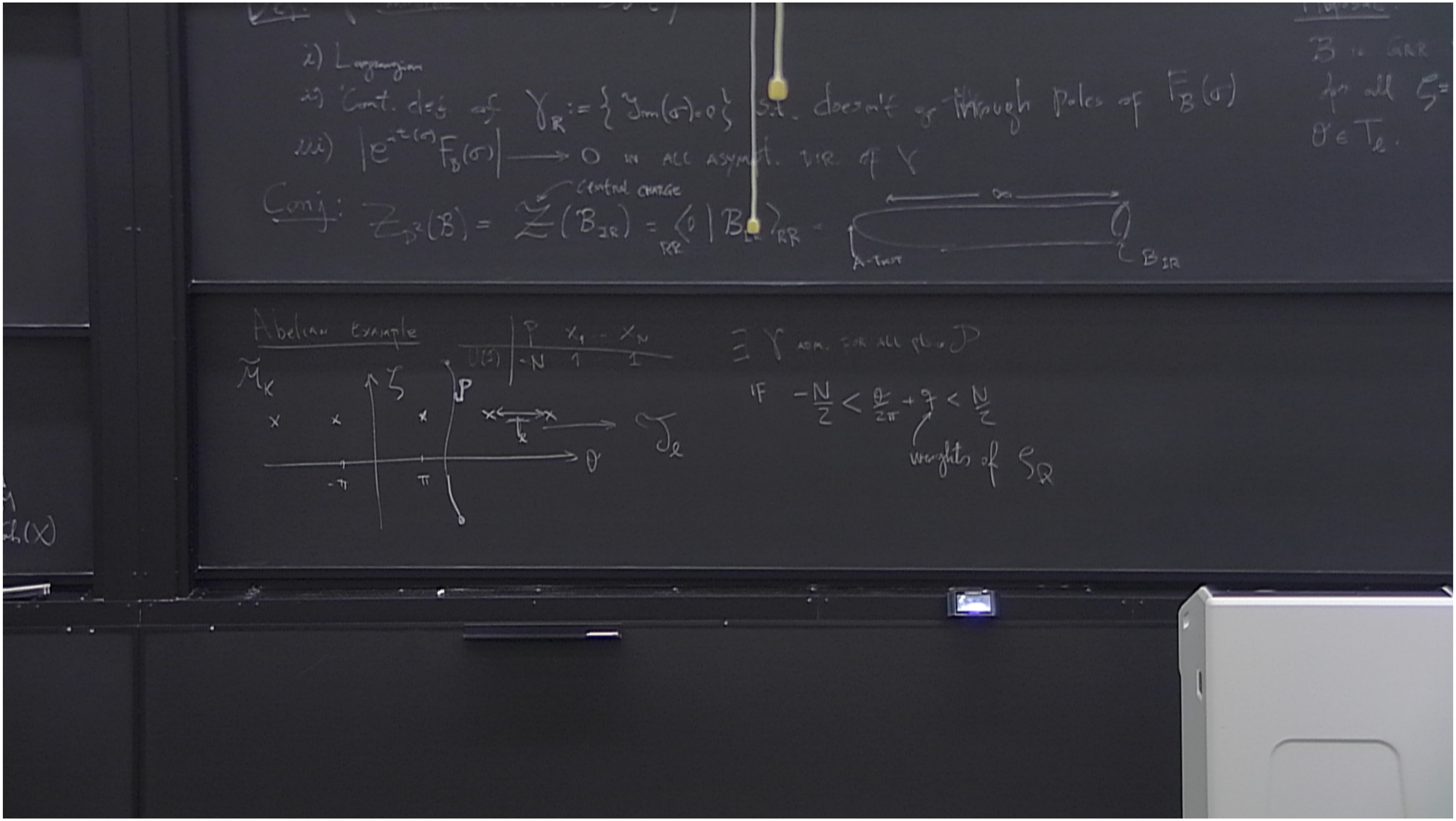

$\ell_G = \dim(T_G)$
$Z_{D^2}(\mathcal{B}) = \int_{\gamma \subset t_{\mathbb{C}}} d^{\ell_G}\sigma \, e^{-i t(\sigma)} F_{\mathcal{B}}(\sigma)$
def. of $\gamma_{\mathbb{R}} := \{ \mathrm{Im}(\sigma) = 0 \}$ s.t. doesn't go through poles of $F_{\mathcal{B}}(\sigma)$
$F_{\mathcal{B}}(\sigma)| \longrightarrow 0$ IN ALL ASYMPT. DIR. OF $\gamma$
Proposal:
$\mathcal{B}$ is GRR IF $\exists$ ADMISSIBLE $\gamma_t$
for all $\zeta = \mathrm{Re}(t)$ and all
$\theta \in T_{\ell}$.

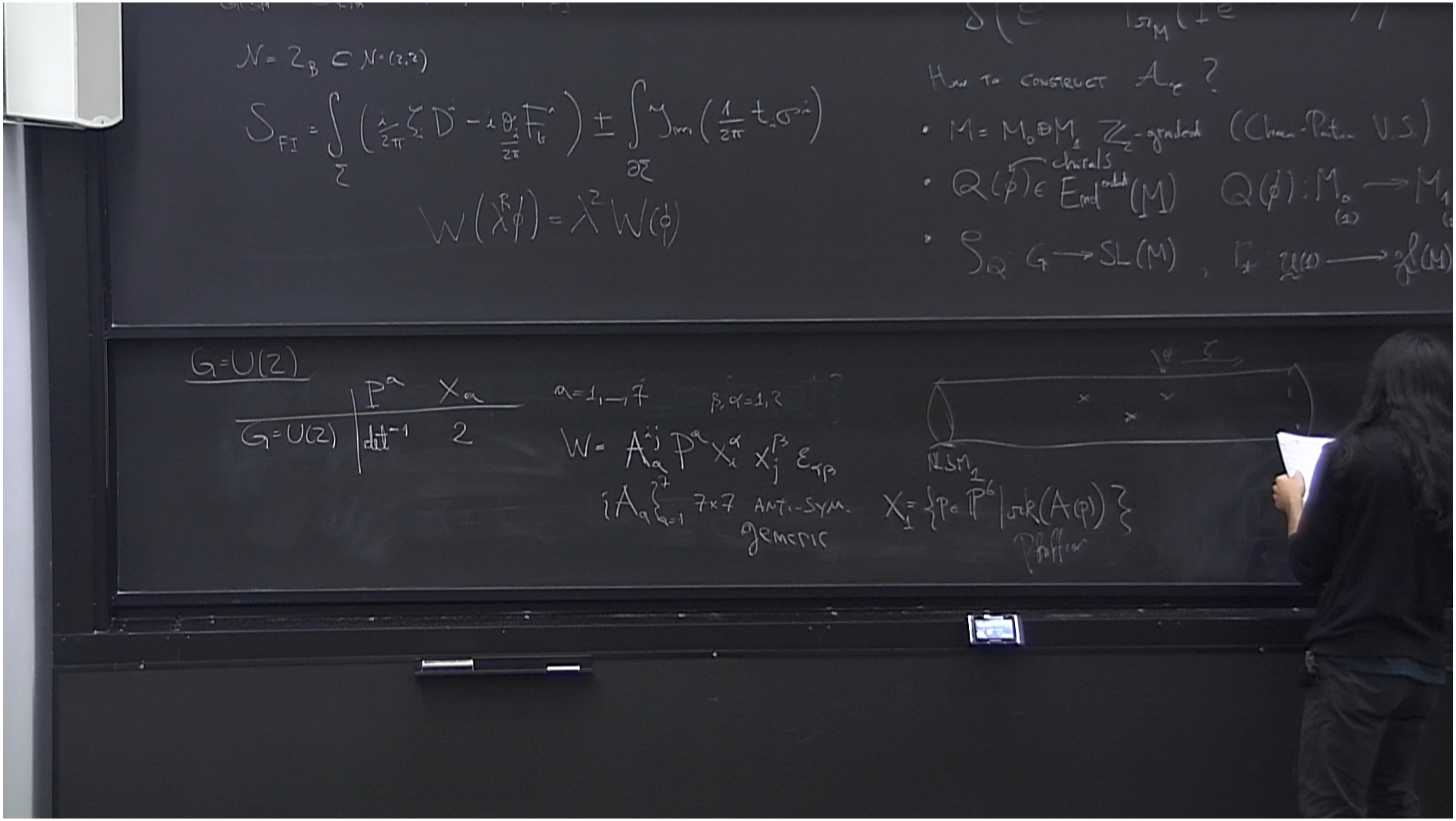

How to construct A_γ ?
M = M_0 ⊕ M_1 Z_2-graded (Chan-Paton V.S.)
chirals
Q(φ) ∈ End^odd(M)
Q(φ): M_0 → M_1
Q²(φ) = W(φ) 1_M
ρ_Q : G → SL(M)
U(1) → gl(M) ← Compatible w/ ρ_V, R
B-brane Transport & GRR
B ∈ MF_{U(1)×U(1)_R}(W)
π_1
π_2
LG
NLSM
D^b Coh(X)
Neumann
Asympt. of γ depending on some Im(W̃_eff[B])

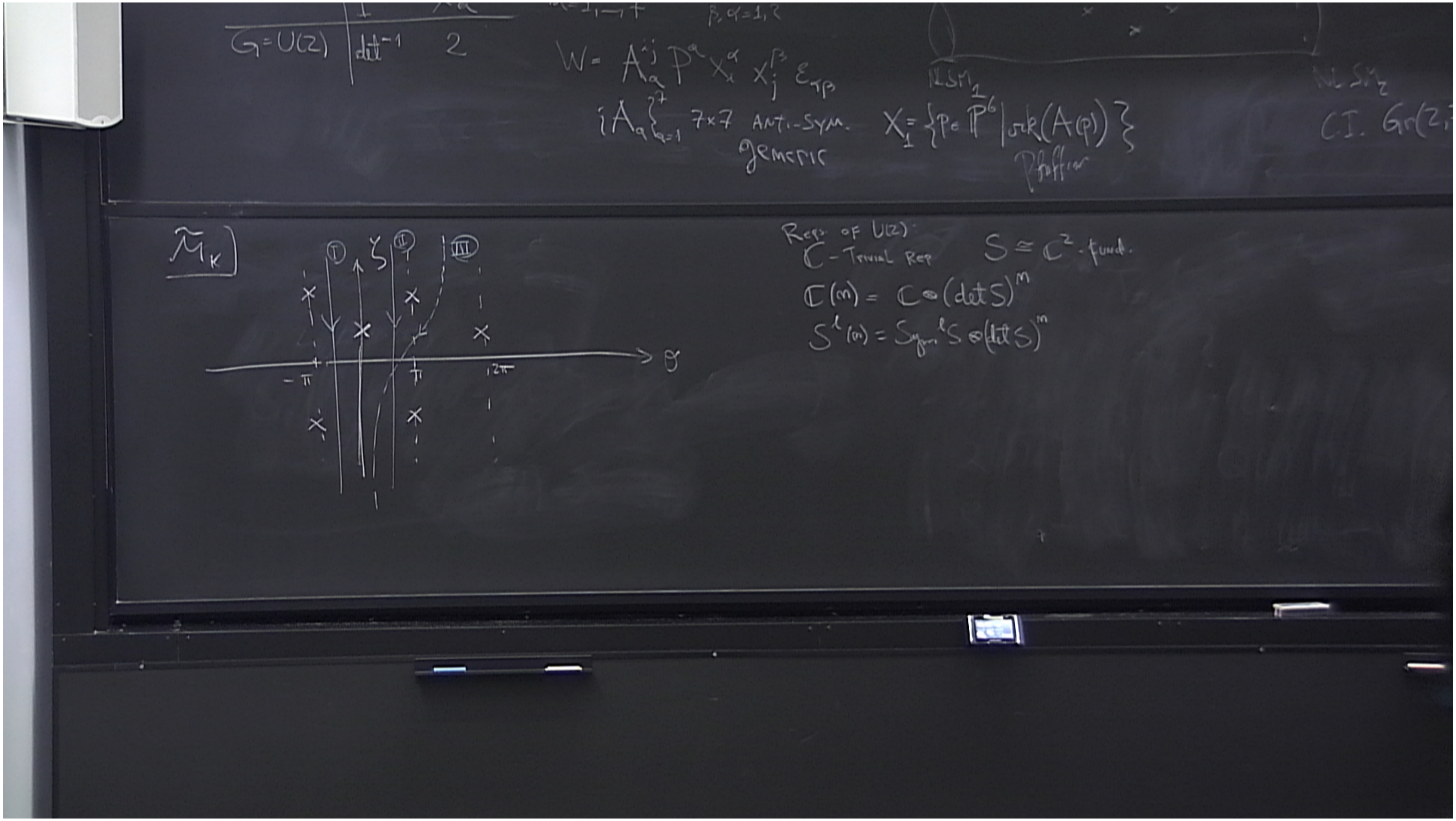

i) Lagrangian
ii) Cont. def. of γ_R := { Im(σ)=0 } s.t. doesn't go through poles of F_B(σ)
iii) → 0 in ALL ASYMPT. DIR. of γ
CENTRAL CHARGE
Conj:
A-TWIST
B_IR

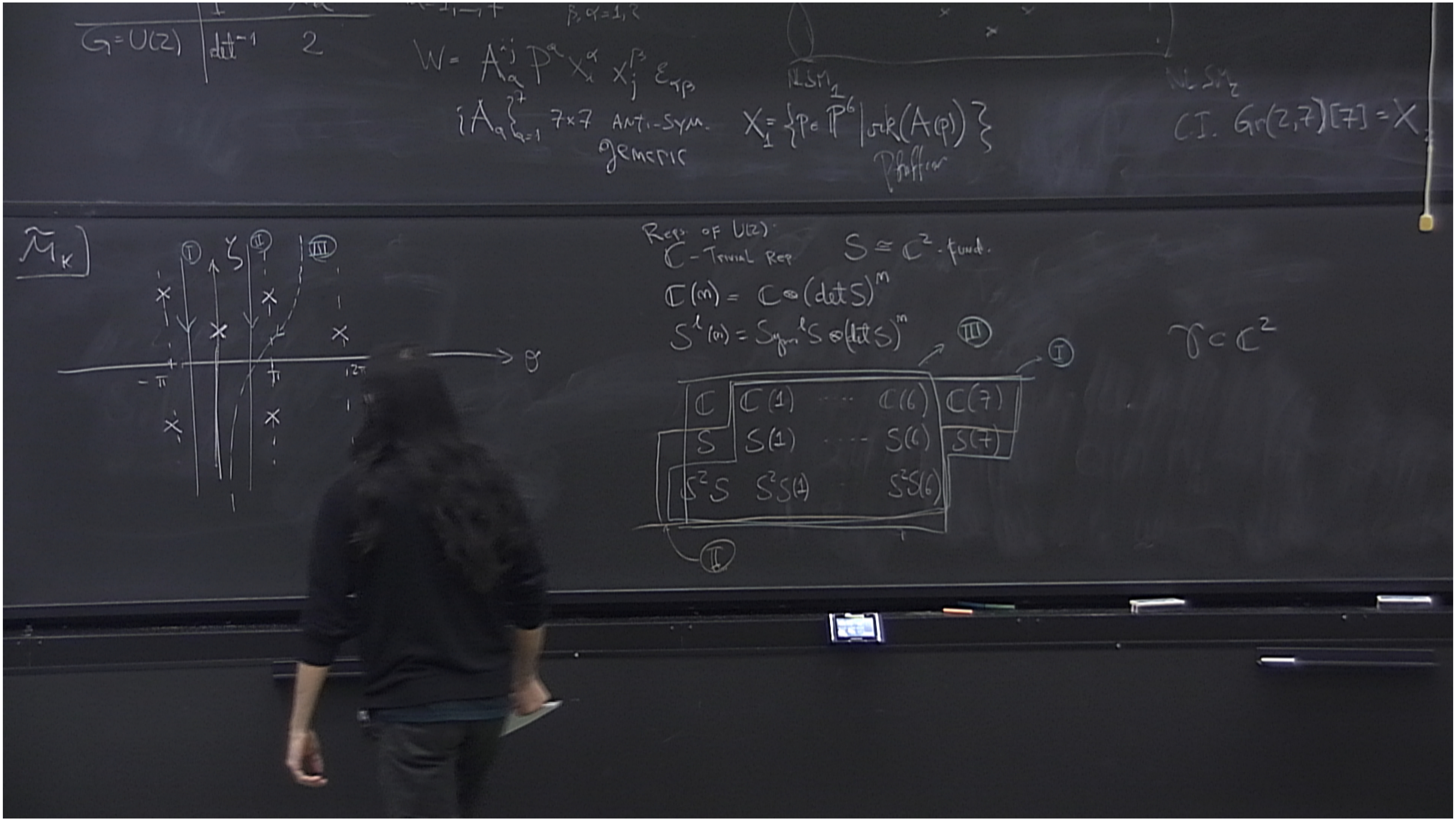

Lagrangian
Conj:
Central charge
A-twist
Abelian Example


i) Lagrangian
iii)
CENTRAL CHARGE
Conj:
A-TWIST
Abelian Example
IF
weights of


i) Lagrangian
ii) Cont. def. of
doesn't go through poles of
iii)
in ALL ASYMPT. DIR. of
central charge
Conj:
A-TWIST
Abelian Example
IF
weights of


How to construct
• M = M₀⊕M₁ Z₂-graded
chirals
G=U(2)
G=U(2)
det⁻¹
2
W=
ANTI-SYM.
generic
NLSM
Pfaffian


G=U(2) | det^-1 2
W = A_a^ij P^a X_i^α X_j^β ε_αβ
{A_a}_{a=1}^7 7×7 ANTI-SYM.
generic
NLSM_1
X_1 = {p ∈ P^6 | rk(A(p)) }
Pfaffian
NLSM_2
C.I. Gr(2,
M̃_K
θ
-π
π
2π
Reps of U(2)
C - Trivial Rep
S ≅ C^2 - fund.
C(n) = C ⊗ (det S)^n
S^l(n) = Sym^l S ⊗ (det S)^n


G = U(2)
7×7 ANTI-SYM.
generic
NLSM
C.I. Gr(2,7)[7] = X
Pfaffian
Reps of U(2)
C - Trivial Rep
S ≅ C² - fund.
C(m) = C ⊗ (det S)^m