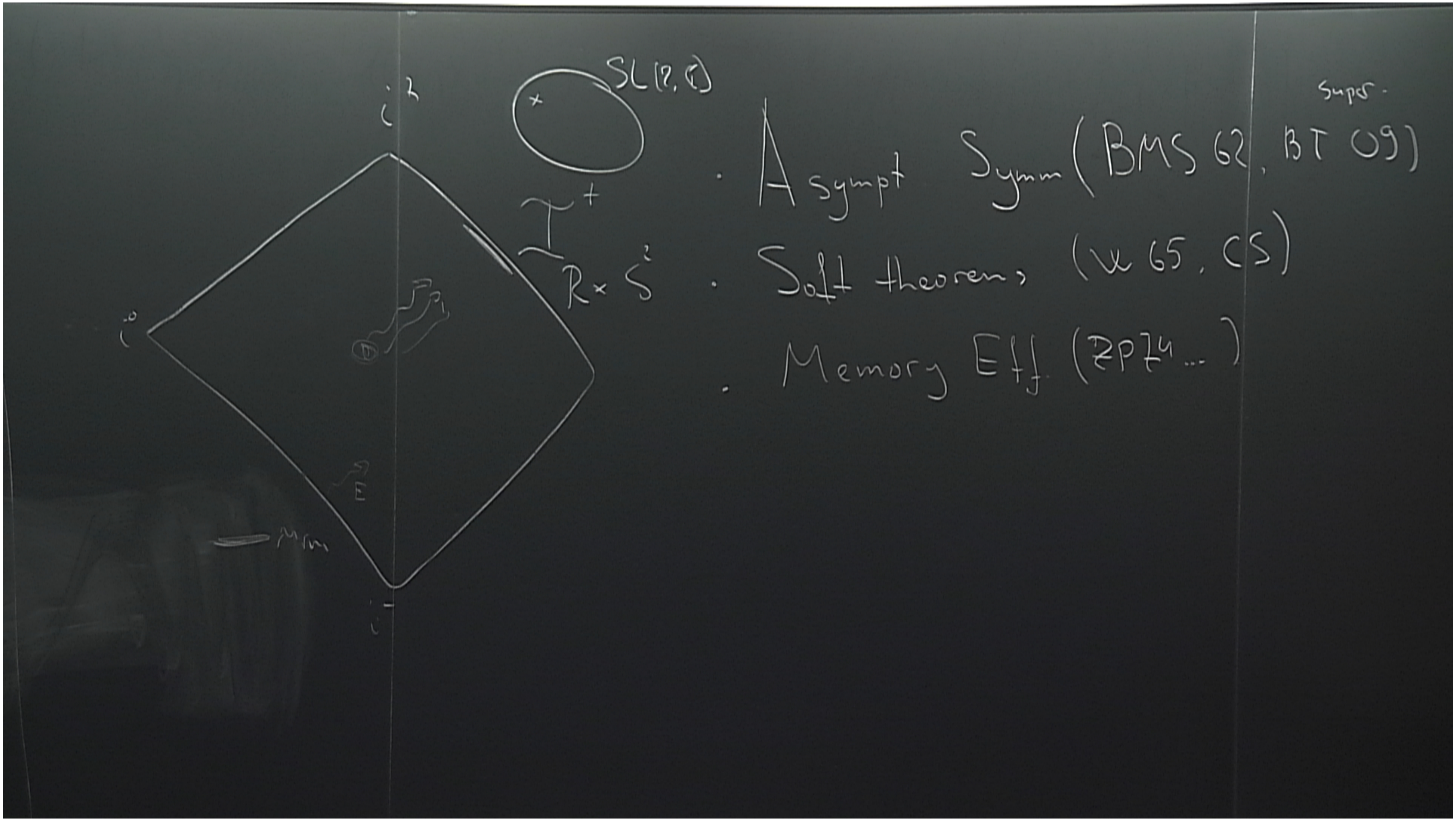
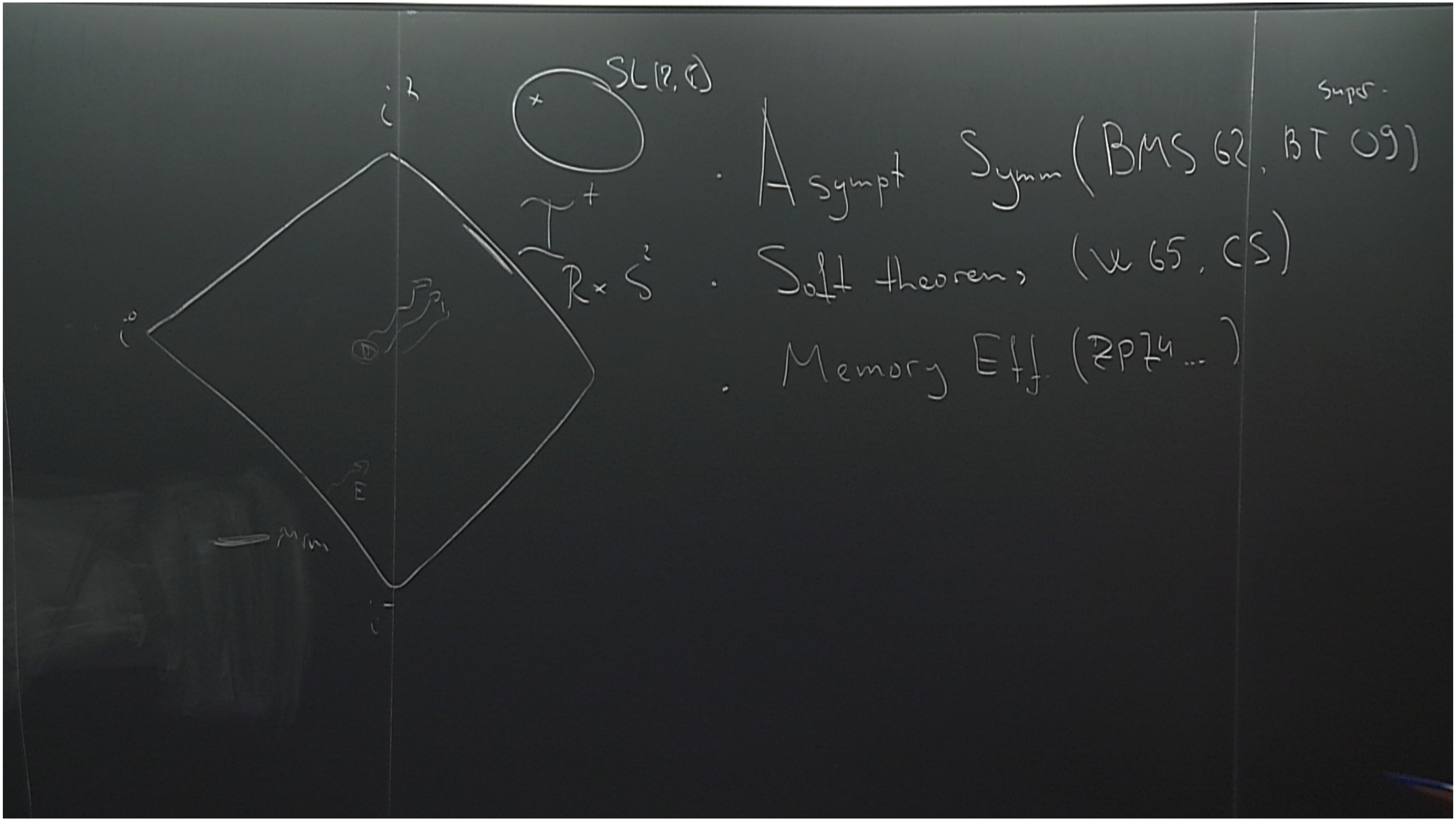
Title: Bounds on the Three-point Functions of Operators With Spin - Alexander Zhiboedov

Date: Feb 24, 2016 10:00 AM

URL: http://pirsa.org/16020097

Abstract:


SL(2,C)
Super.
Asympt Symm (BMS 62, BT 09)
Soft theorems (W 65, CS)
Memory Eff. (ZP 74 ...)
$\mathcal{I}^+$
$\mathbb{R} \times S^2$
i^+
i^0
i^-
E


SL(2,C)
Super.
· Asympt Symm (BMS 62, BT 09)
· Soft theorems (W 65, CS)
· Memory Eff. (ZP 74 ...)
$\mathcal{I}^+$
$R \times S^2$
i^+
i^0
i^-
E

$$ASG = \frac{\text{Allowed Diffs}}{\text{Trivial Diffs}}$$

BMS :

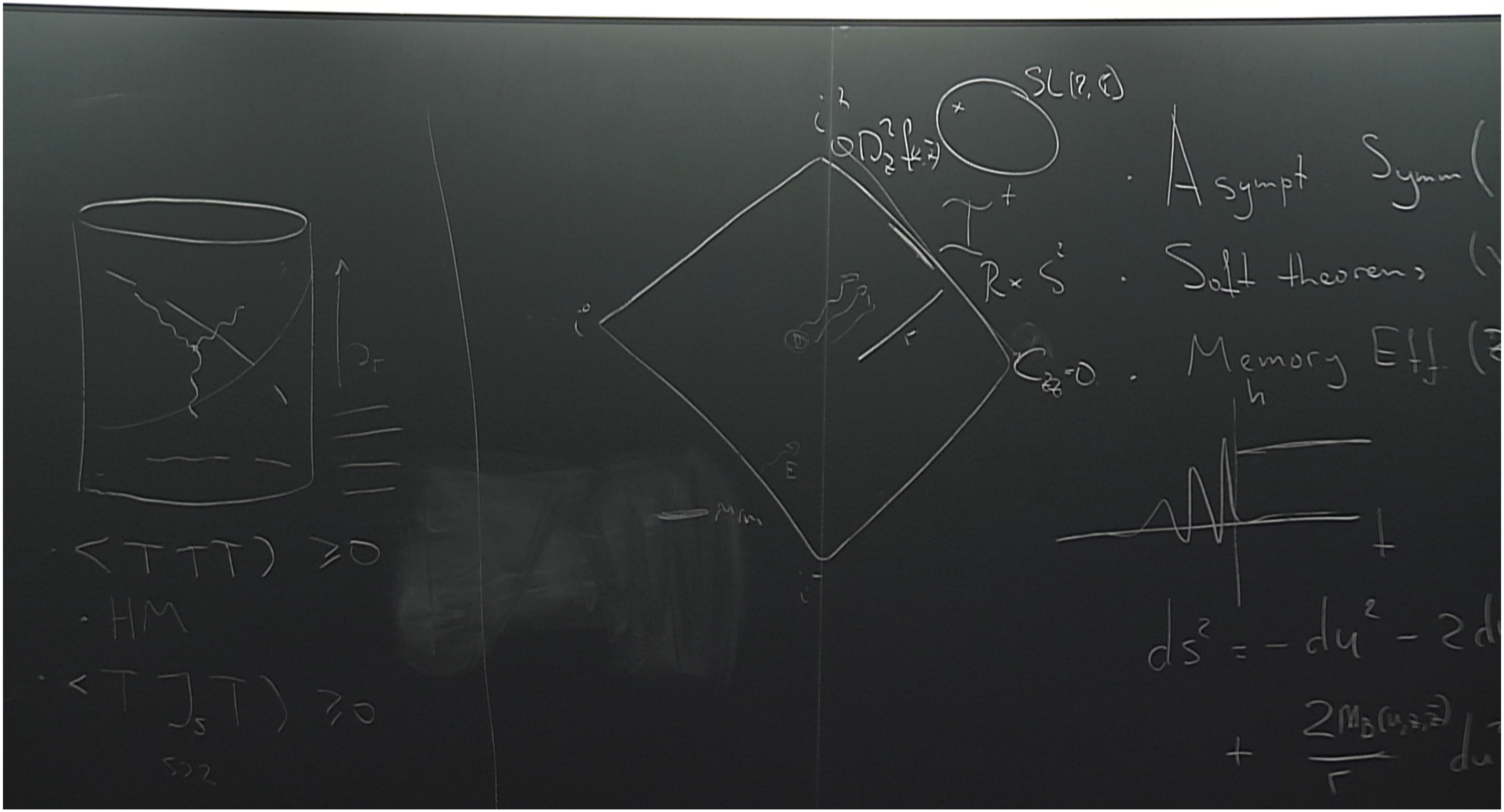
$$ST : [T_n, T_m] = 0$$

$$SL(2,\mathbb{C}) \; (L_{+1,0,-1}, \bar{L}_{+1,0,-1})$$

$$f(z,\bar{z}) = \sum C_{l,m} Y_{l,m}$$

M

"hard part of ..


SL(2,C)
· Asympt Symm
· Soft theorems
· Memory Eff.
R × S^2
C_zz = 0
· <TTTT> ≥ 0
· HM
· <T J_s T> ≥ 0
s>2
ds^2 = - du^2 - 2d
+ 2m_B(u,z,z̄)/r du

$$\xi^\mu \partial_\mu \to f(z,\bar z)\,\partial_u + \dots$$

$$\mathcal{L}_\xi C_{zz} = f \, N_{zz} - 2 D_z^2 f(z,\bar z)$$

$$\boxed{T[f] = \frac{1}{4\pi G} \int_{\mathcal{I}^+_-} \gamma_{z\bar z} \, f \, m_B}$$

$$\left[- \int_{\mathcal{I}^+} du \, \partial_u m_B = \right.$$

$$m_B \big|_{\mathcal{I}^+_-} =$$

$$\ldots f(z,\bar z)\,\partial_u + \ldots$$

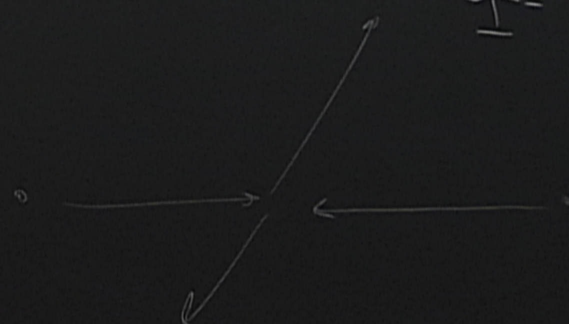
$$\partial_{\zeta} C_{zz} = \int_0 N_{zz} - 2D_z^2 f(z,\bar z)$$

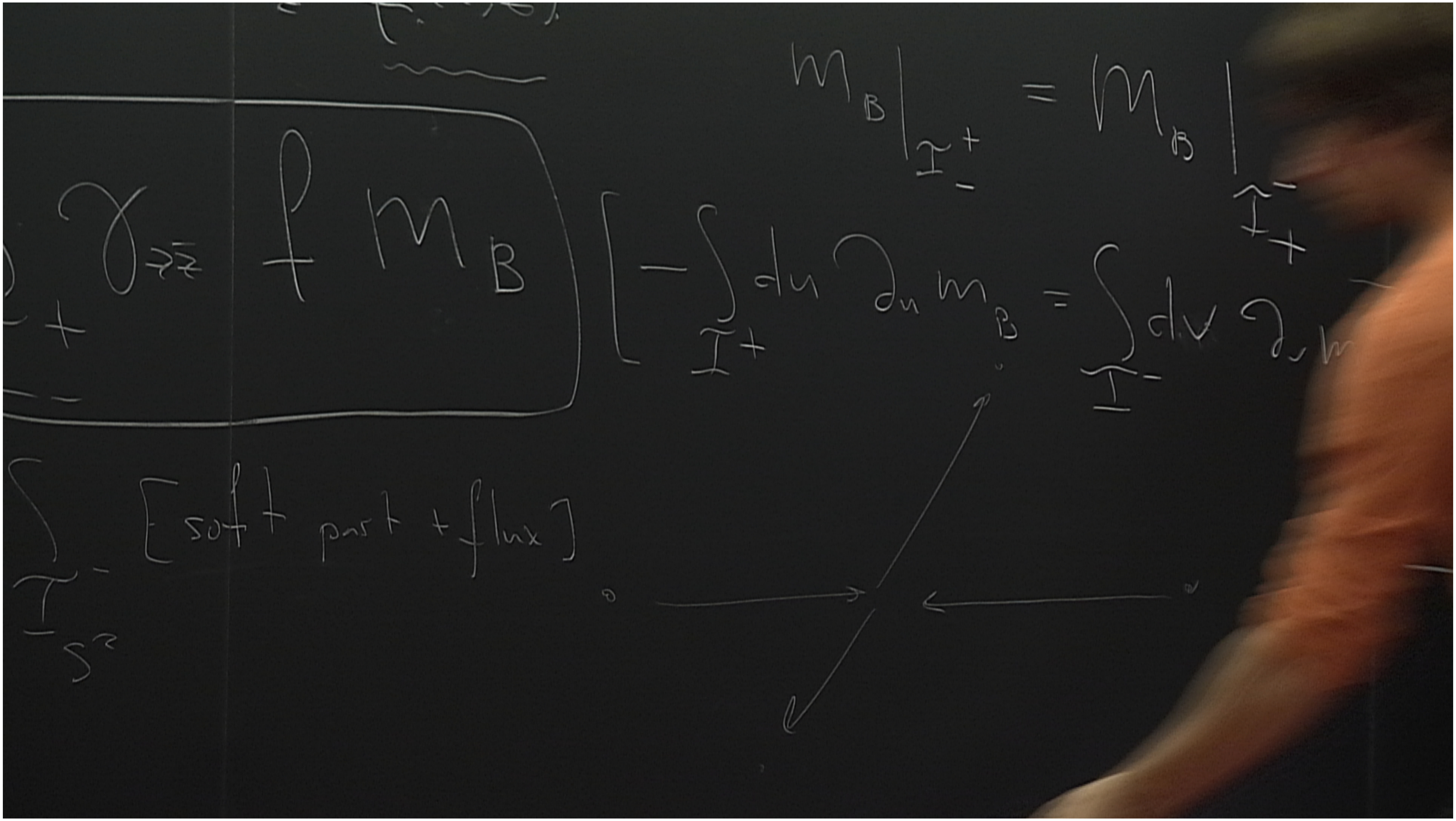
$$\boxed{T[f] = \frac{1}{4\pi G}\int_{\mathcal{I}^+_-} \gamma_{z\bar z}\, f\, m_B}$$

$$m_B\big|_{\mathcal{I}^+_-} = m_B$$

$$\left[-\int_{\mathcal{I}^+} du\,\partial_u m_B = \int_{\mathcal{I}^-} dv\right.$$

$$\int_{\mathcal{I}^+ S^2} du\,[\text{soft part} + \text{flux}] = \int_{\mathcal{I}^-_{S^2}} [\text{soft part} + \text{flux}]$$





m_B |_{I^+_-} = m_B |_{I^-_+}
[- ∫_{I^+} du ∂_u m_B = ∫_{I^-} dv ∂_v m
∫_{I^-_{S^2}} [soft part + flux]

$$C_{zz} = -u\{f,z\}$$

$$\{f,z\} = \frac{f'''}{f'} - \frac{3}{2}\left(\frac{f''}{f'}\right)^2$$

$$N_{zz} = \{f,z\}$$

Penrose warp (1972)

super

$u=0$

$$z_+ = f(z_-)$$

$$1 + f\bar{f}$$

$\{f, z\}$

$$- \frac{3}{2}\left(\frac{f''}{f'}\right)^2$$

$$R_{uzuz} = \frac{r}{2}\,\delta(u)\,\{f, z\}$$

$- 2\,du\,dr - du^2 -$

$$R_{uu} = \frac{u\,\delta(u)}{r^2}$$

Penrose warp (1972)

$u=0$

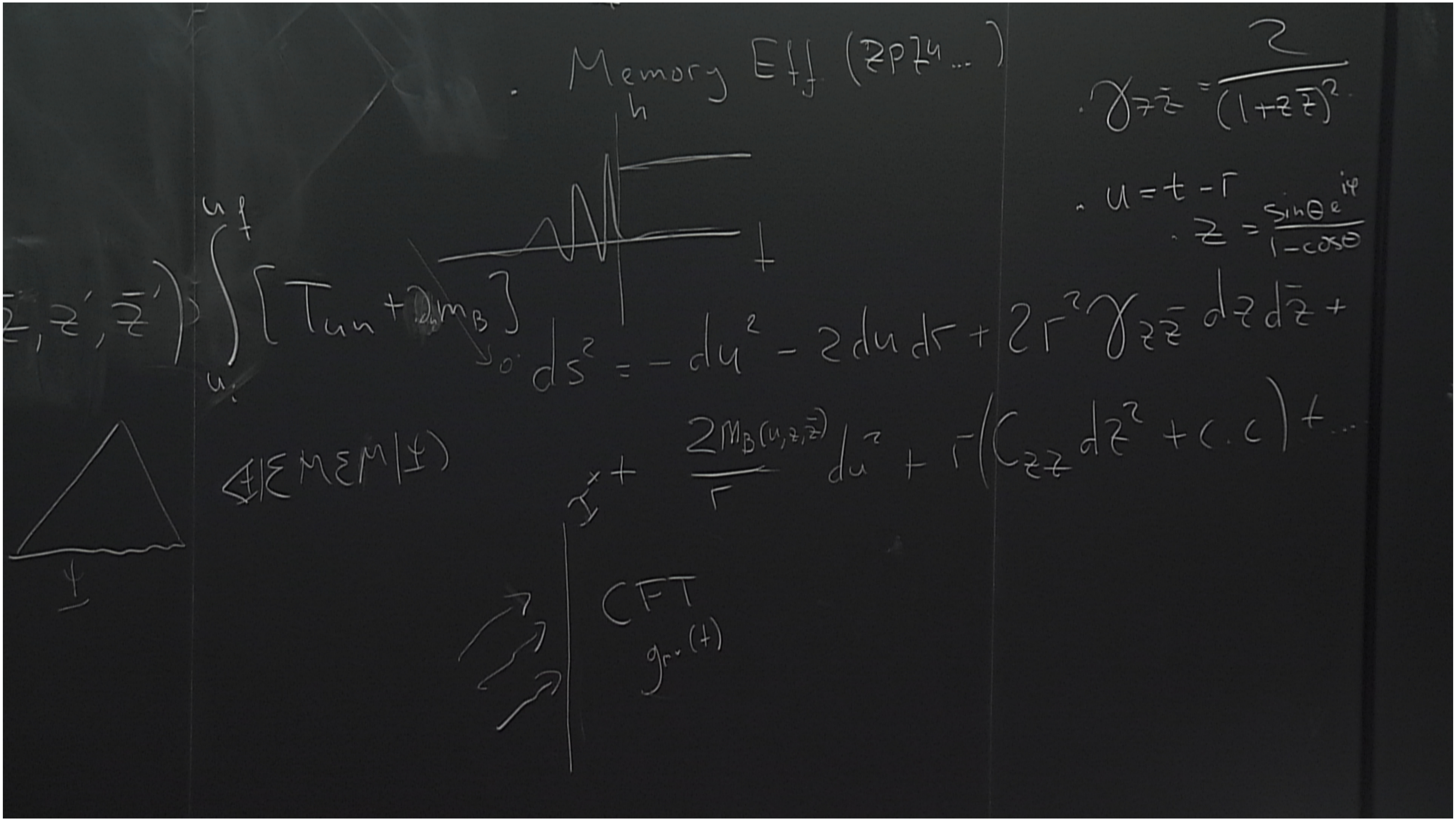
$ds^2 = -du^2 - 2$

$$-2\,du\,dr - du^2 + r\,\Theta(u)\left(u\{f,z\}\,dz^2 + \dots\right)$$

$$R_{uu} = \frac{u\,\delta(u)}{r^2}\{f,z\}\{\bar{f},\bar{z}\}$$

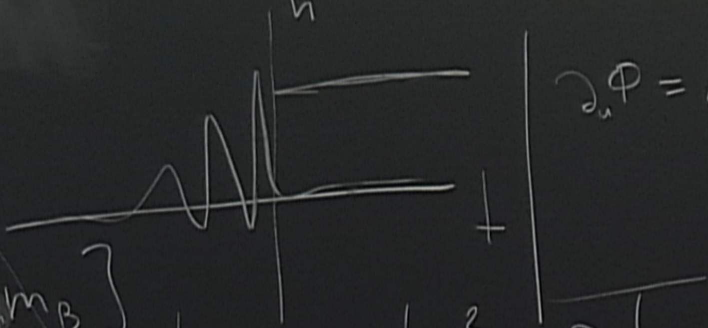
$$ds^2 = -du^2 - 2\,du\,dr + r^2\left(d\theta^2 + (1-4G\mu)^2 \sin^2\theta\, d\varphi^2\right)$$

$$C_{zz} = \frac{4G\mu(1-2G\mu)}{z^2} = \{f,z\} \qquad \boxed{f(z) = z^{1-4G\mu}}$$


Memory Eff (ZPZY...)
h
t
γzz̄ = 2/(1+zz̄)^2
u = t - r
z = sinθ e^iφ / (1-cosθ)
ds^2 = -du^2 - 2du dr + 2r^2 γzz̄ dz dz̄ +
2mB(u,z,z̄)/r du^2 + r(Czz dz^2 + c.c) + ...
z, z', z̄'
uf
ui
[Tuu + ∂u mB]
Ψ
CFT
gμν(t)

· Soft theorems

· Memory Eff. (ZPZ^u ...)



$\partial_u \Phi = \Delta^2 \Phi$

$\cdot\ \gamma_{z\bar z} = \frac{2}{(1+z\bar z)^2}$

$\cdot\ u = t - r$

$\cdot\ z = \frac{\sin\theta\, e^{i\varphi}}{1-\cos\theta}$

$[T_{uu} + \partial_u m_B]$

$$ds^2 = -du^2 - 2du\,dr + 2r^2\gamma_{z\bar z}\,dz\,d\bar z + \frac{2m_B(u,z,\bar z)}{r}du^2 + r\left(C_{zz}dz^2 + c.c\right) + \dots$$

$\Psi|\mathcal{E}M\mathcal{E}M|\Psi)$

$\mathcal{I}^+$

CFT

$g_{\mu\nu}(t)$