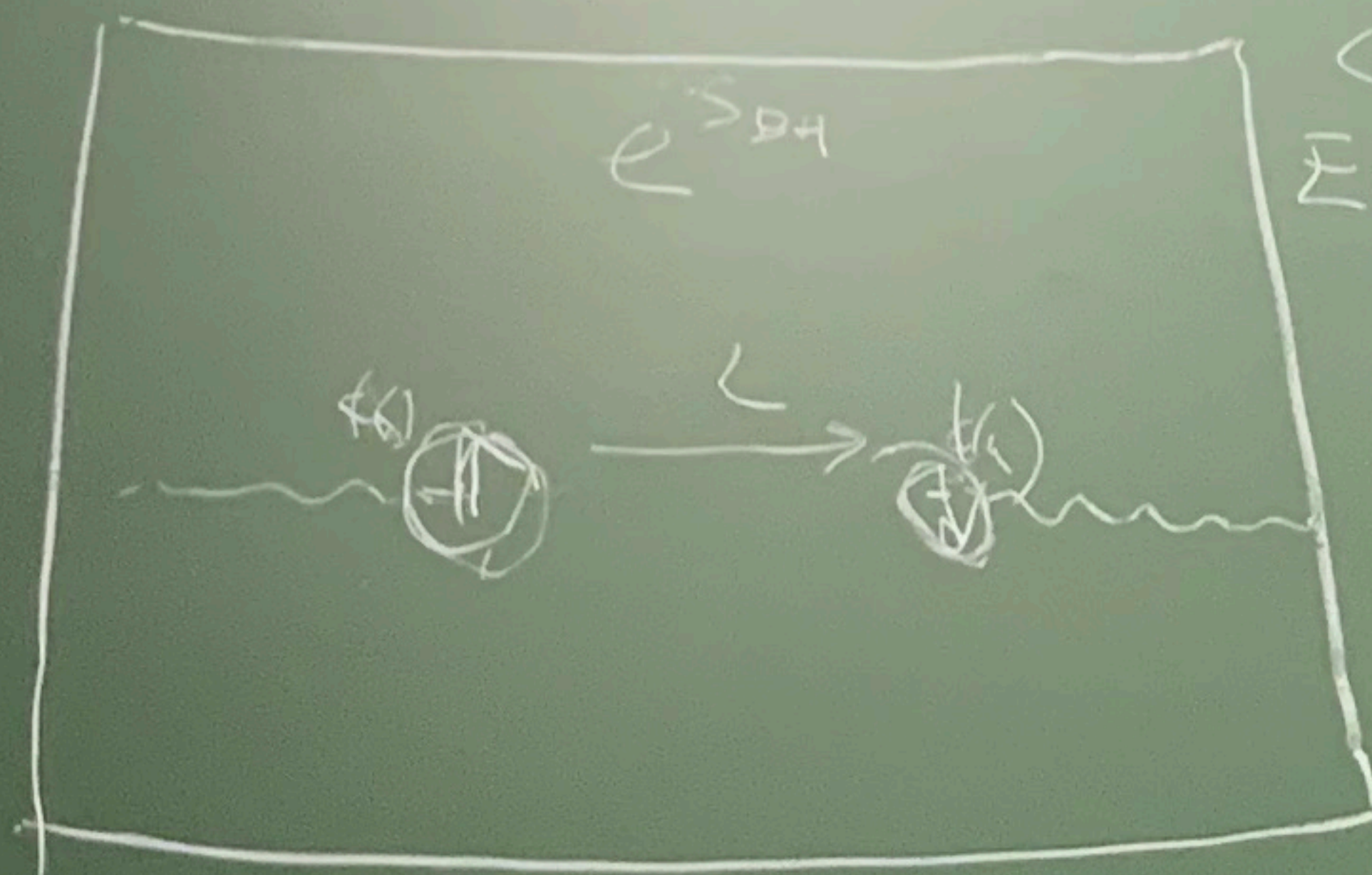
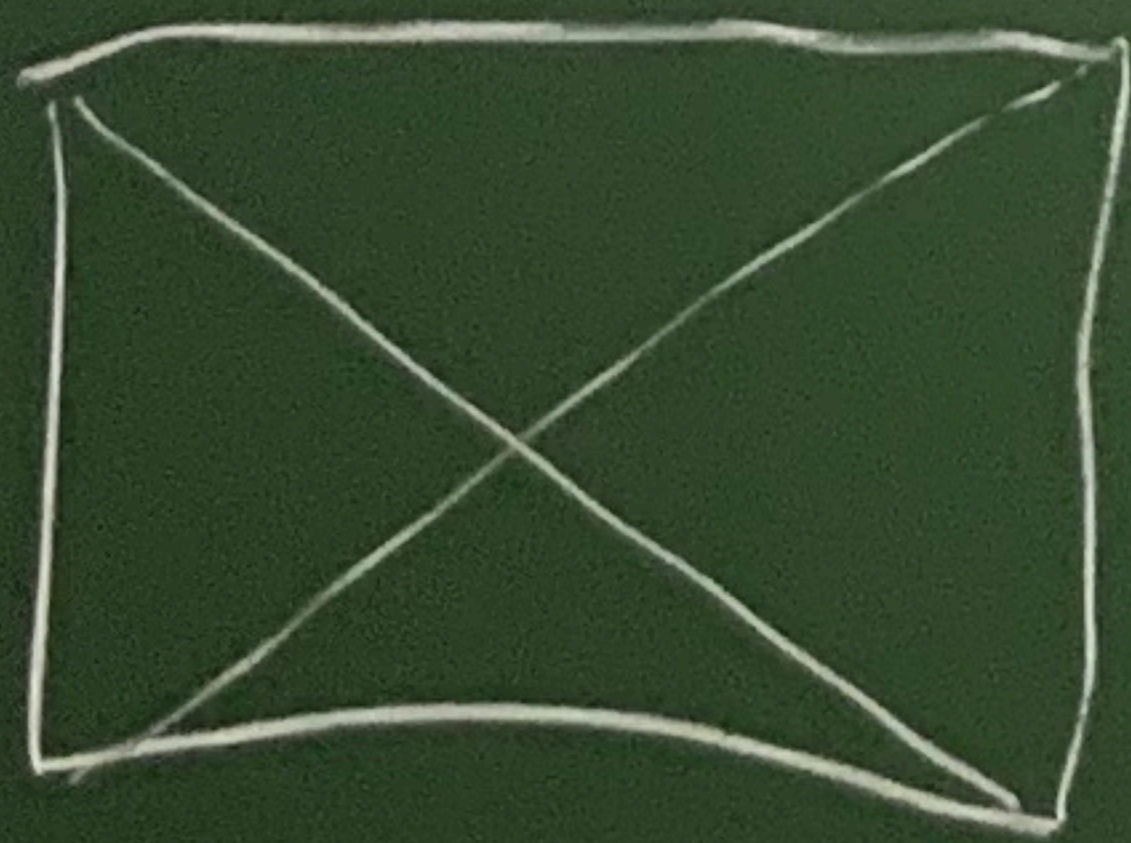
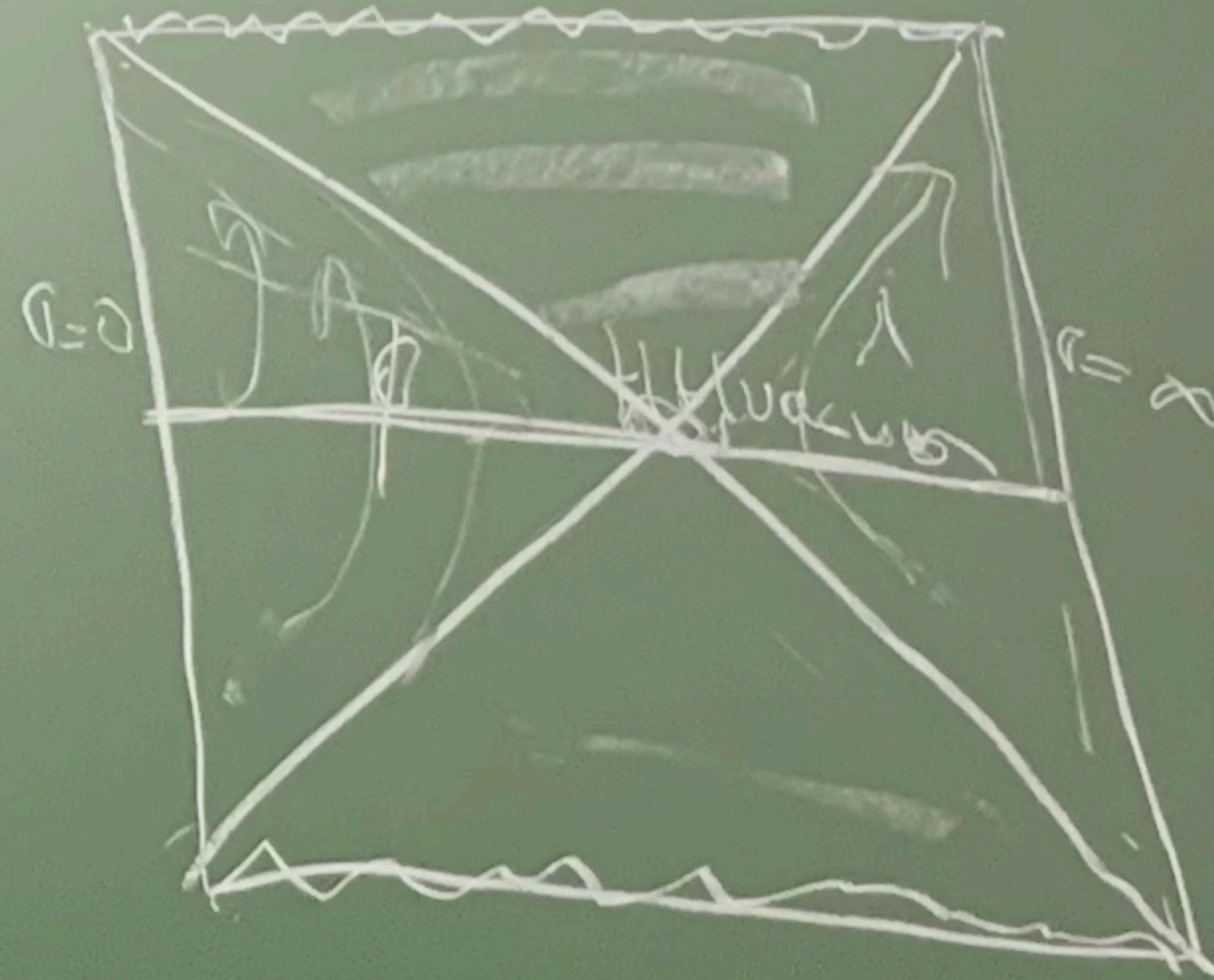


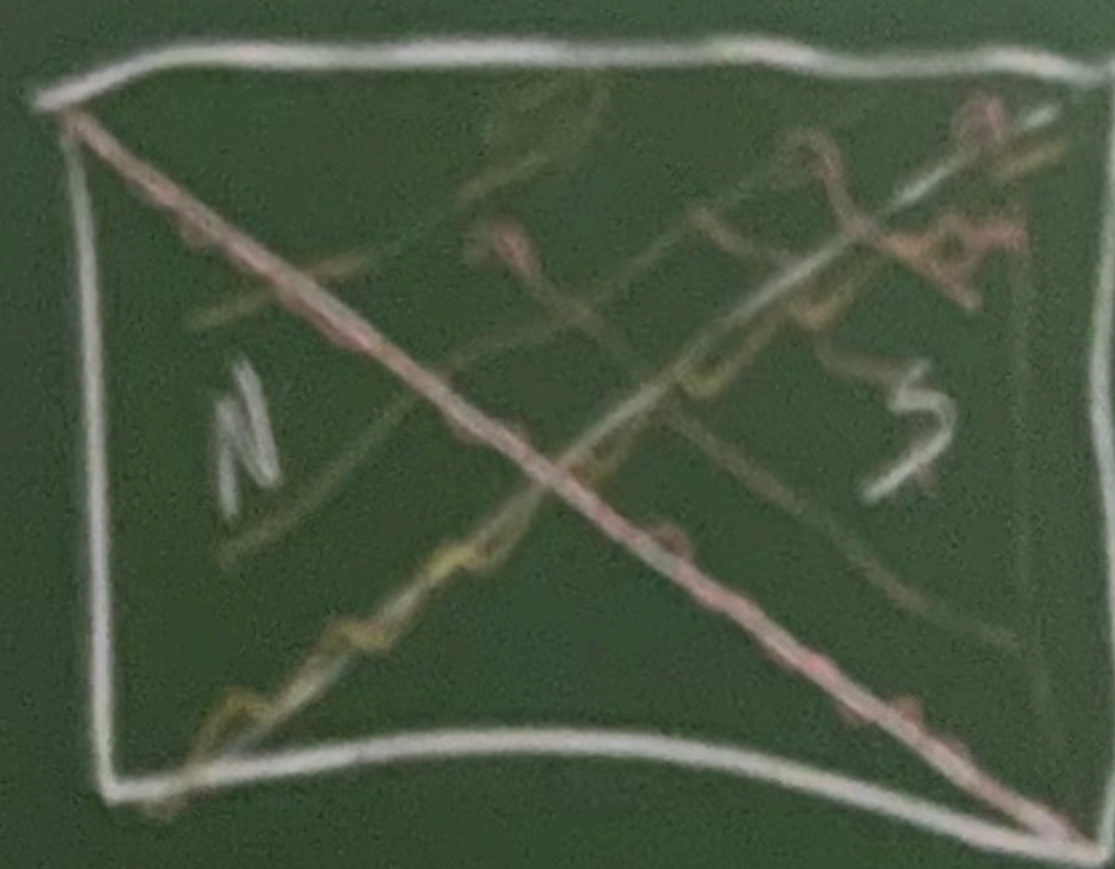
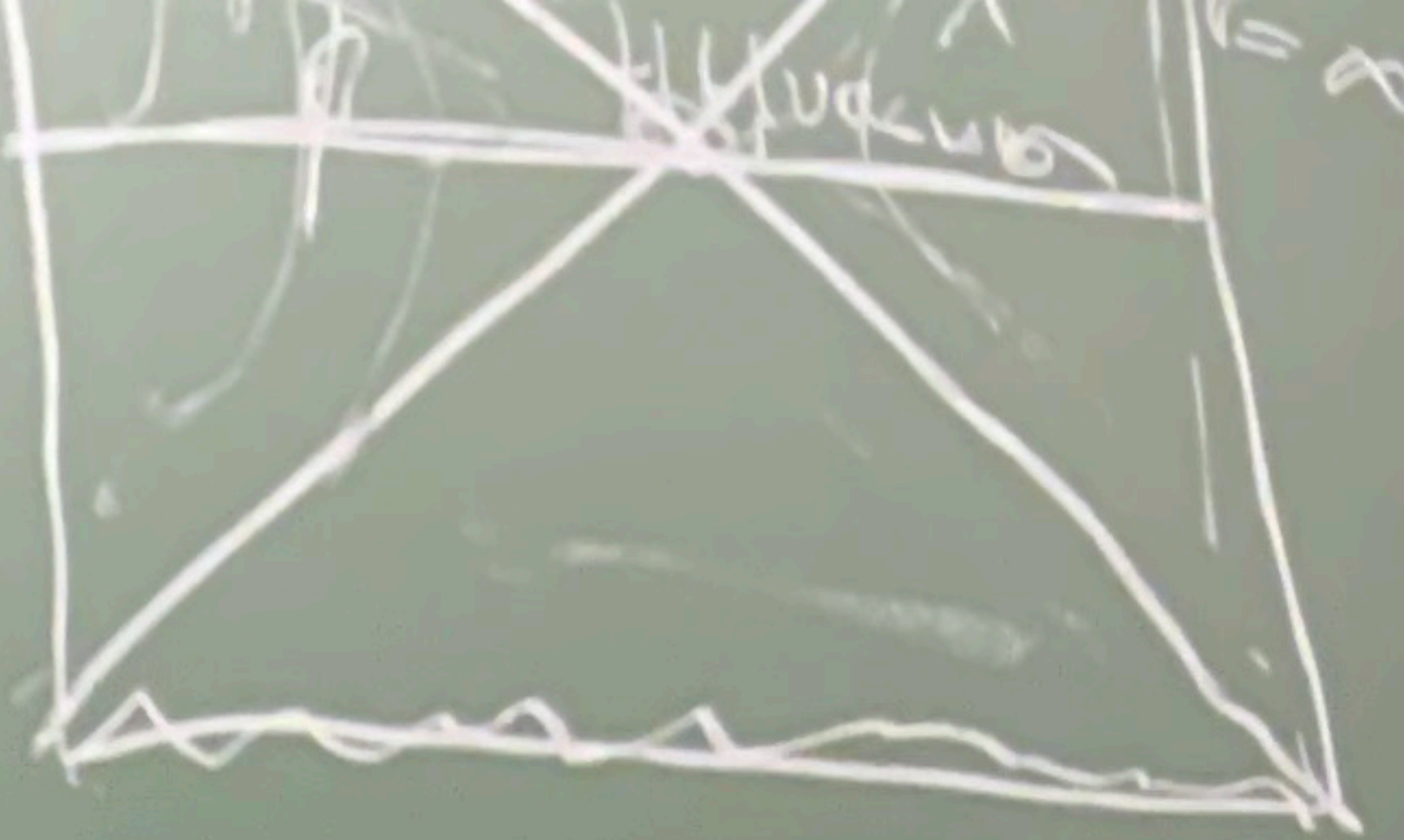
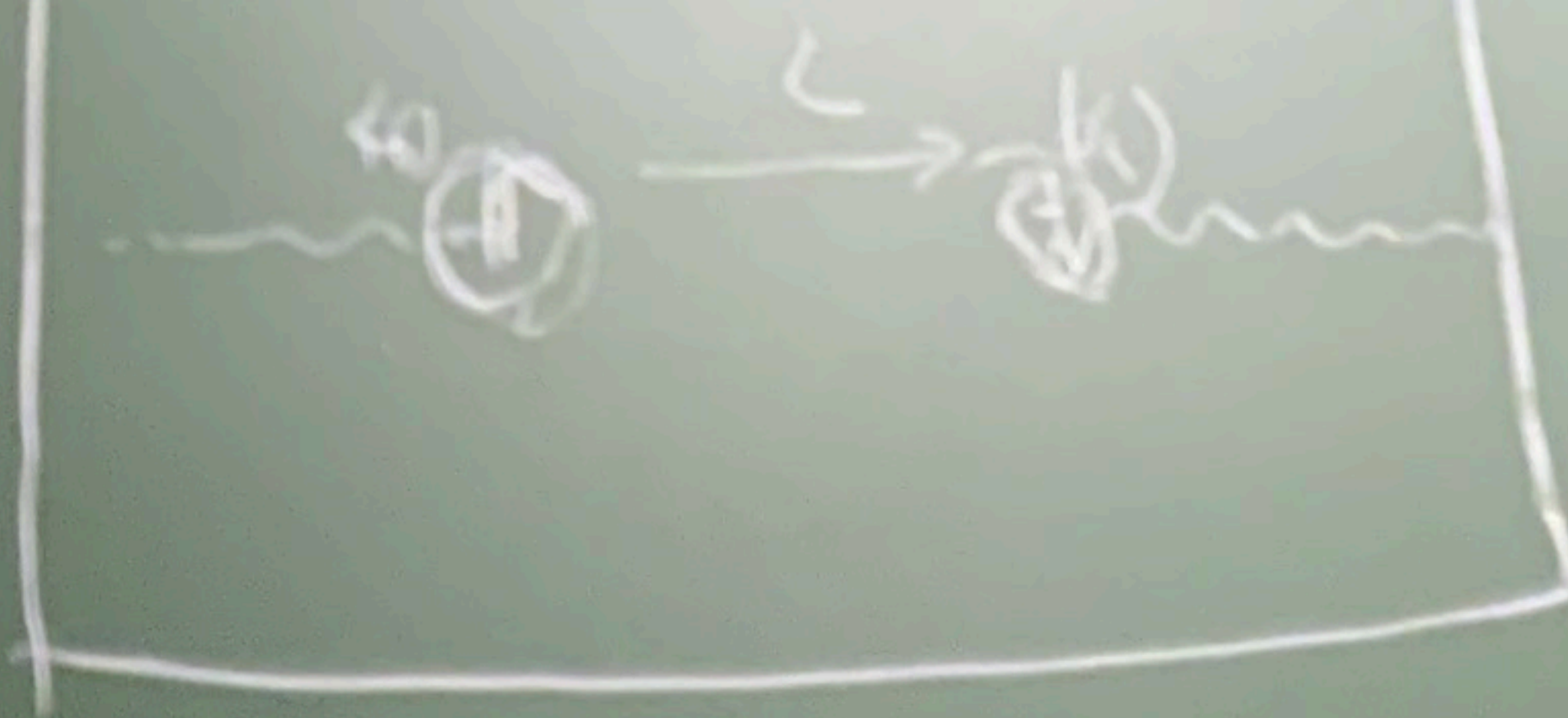
Cosmic ER=EPR in dS/CFT

Jordan Cotler



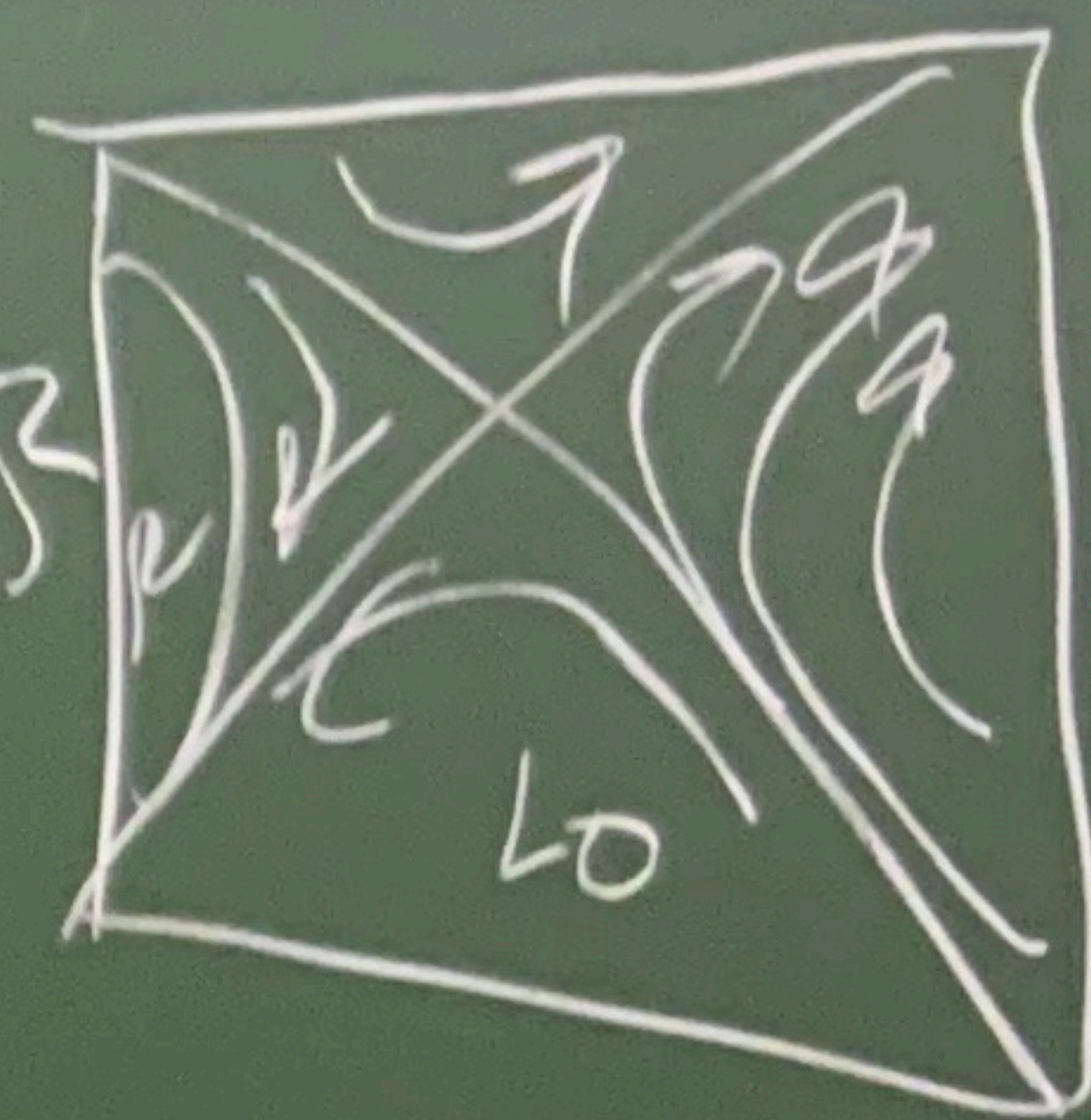
$$\langle \phi(u) \phi(v) \rangle \sim \frac{1}{L^2}$$
$$ER = EPR$$





Quas. normal modes

$$\frac{d^2 \psi}{dx^2} = -k^2 + \cosh^2 L \left(d^2 \psi + \sin^2 \psi (\sin^2 \theta + d^2 \theta)^2 \right)$$



$$\psi \pm \psi_{QN} = \frac{e^{-i\pi h_{\pm}}}{| \sin t - \cos t - i\epsilon |^{h_{\pm}}}$$

$$\psi \pm \psi_{QN} = \dots$$

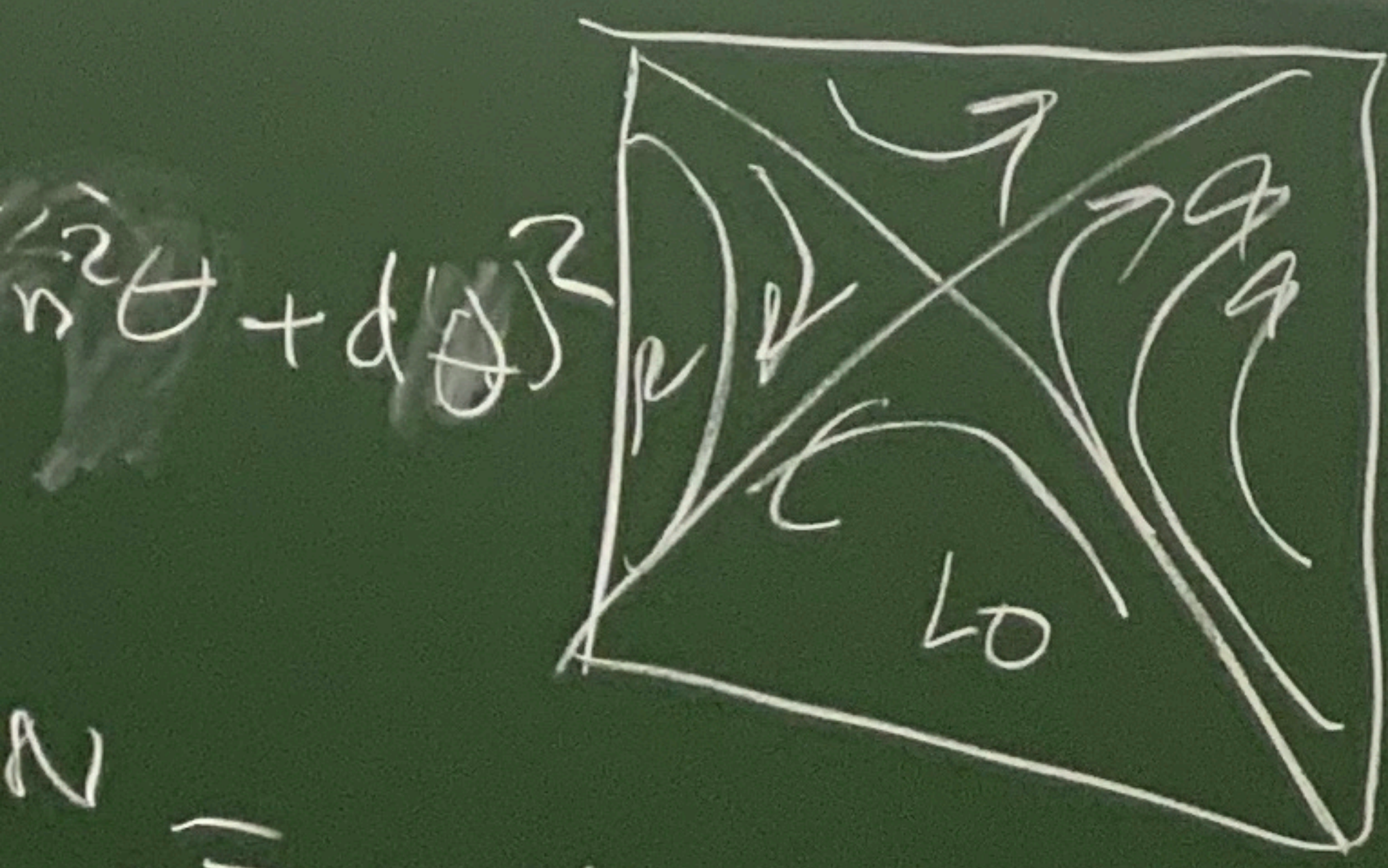
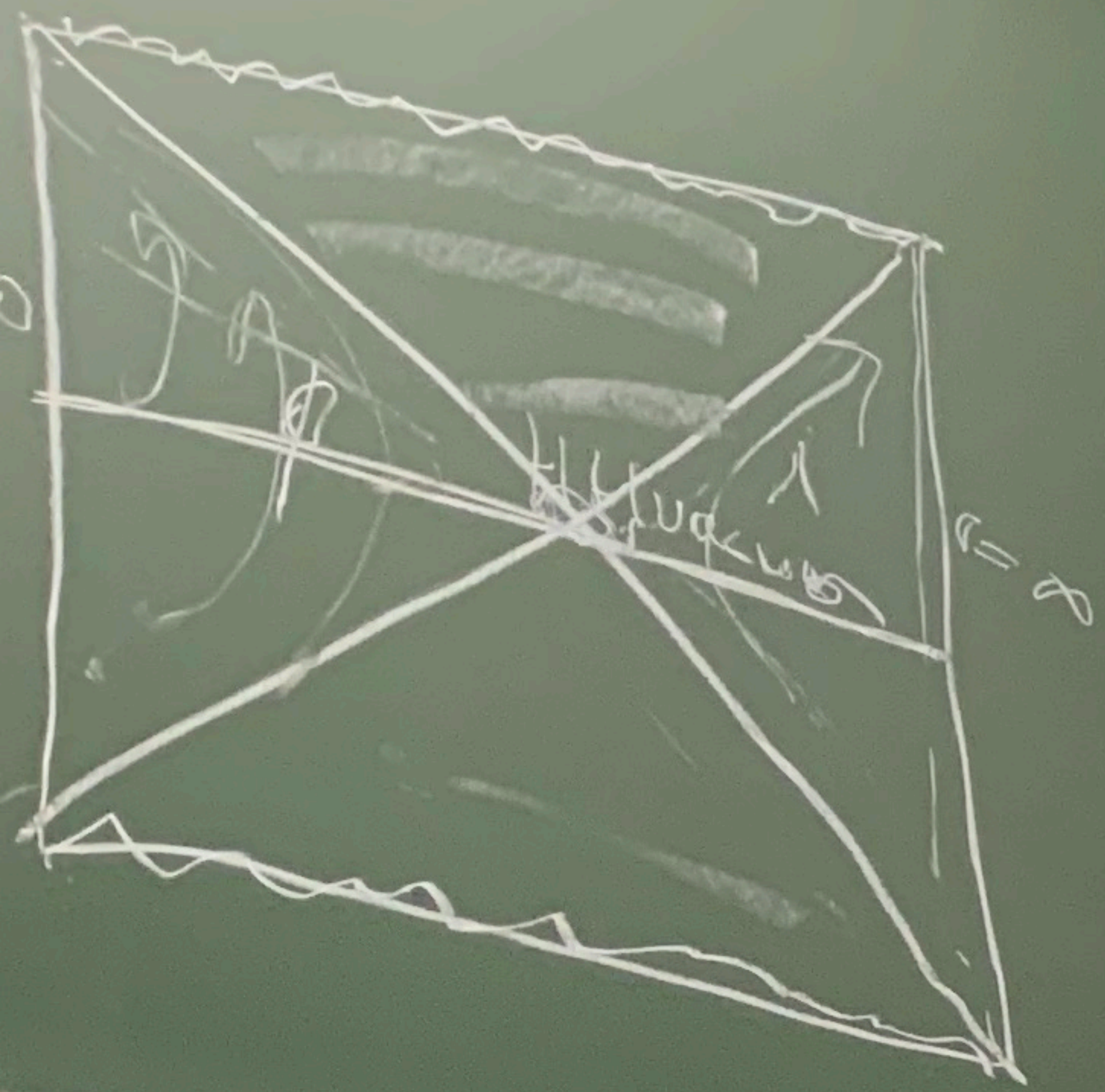
$$h_{\pm} = \frac{3}{2} \pm \sqrt{\frac{9}{4} - m^2 L^2}$$

$$L_0 = -\cos^2 \theta + \tan^2 \theta \sin^2 \theta$$

$$\square \psi = m^2 \psi$$

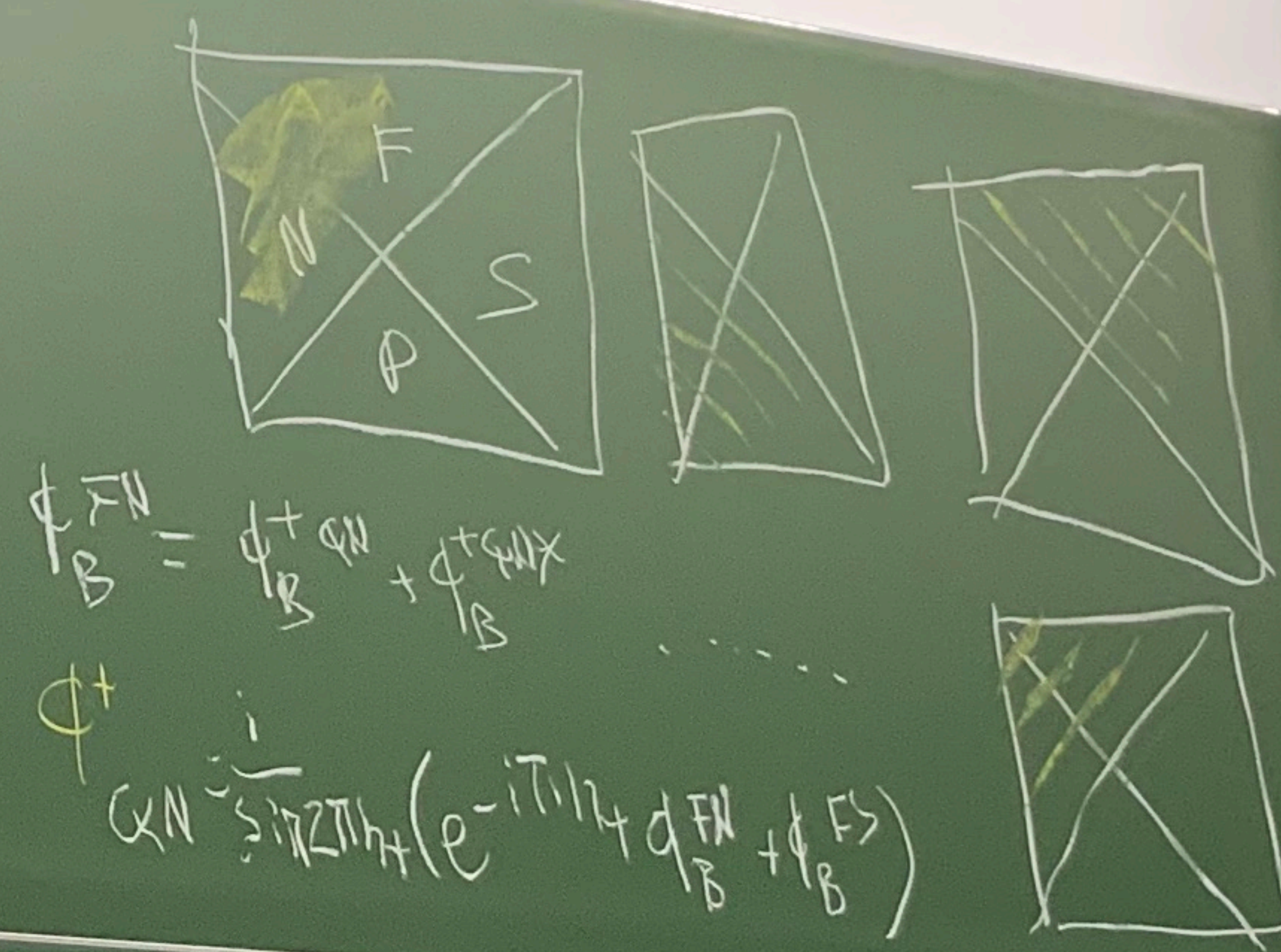
$$H_{static} = iL_0$$

$$L_0 \psi \pm \psi_{QN} = -h_{\pm} \psi \pm \psi_{QN}$$



$\alpha \psi^R + \text{ant} \sin \psi^L = 2$
 $L_0 \phi \pm \psi^N = -h \pm \psi^{\pm i \omega N}$

M_{+k}, M_{-k}, \sqrt{k}
 $M_{-k} \phi^{\pm \omega N} = M_{\pm k} \phi^{\pm \omega N}$
 $\phi^{\pm \omega N}_A, \phi^{\pm \omega N}_B, \dots$

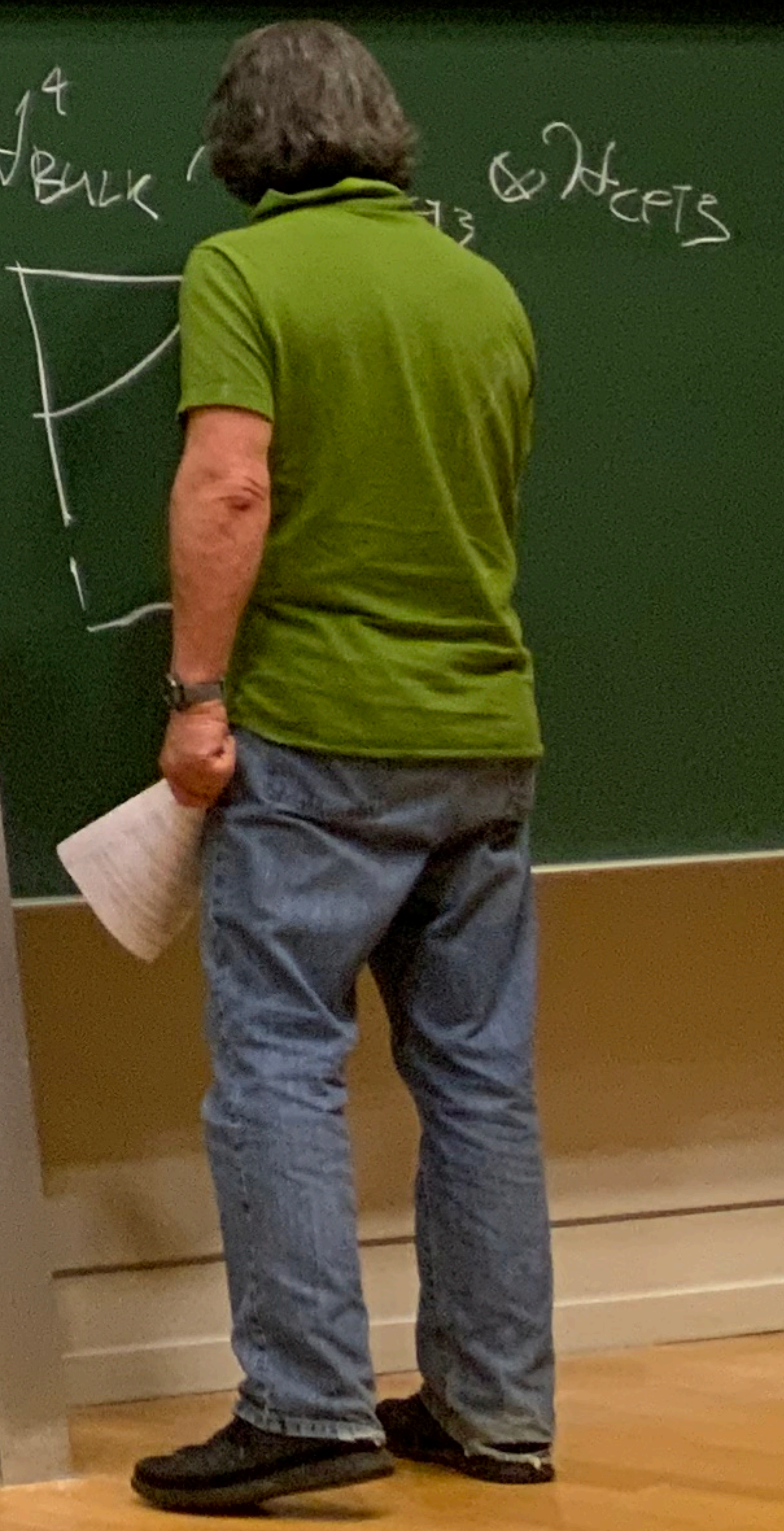
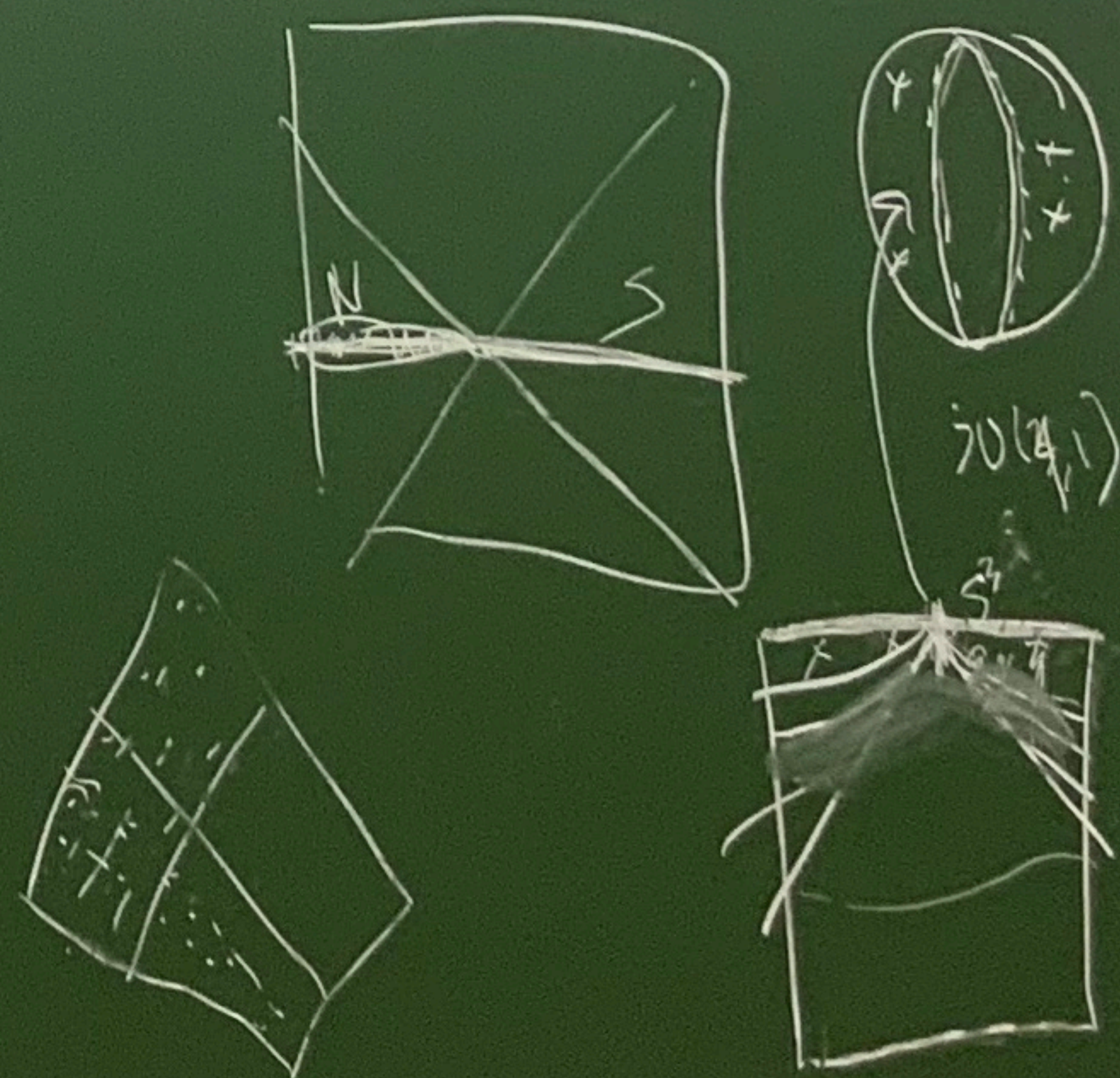


$(\phi_1, \phi_2) = i \int d^3x \Sigma^M \phi_1^* \nabla_M \phi_2$

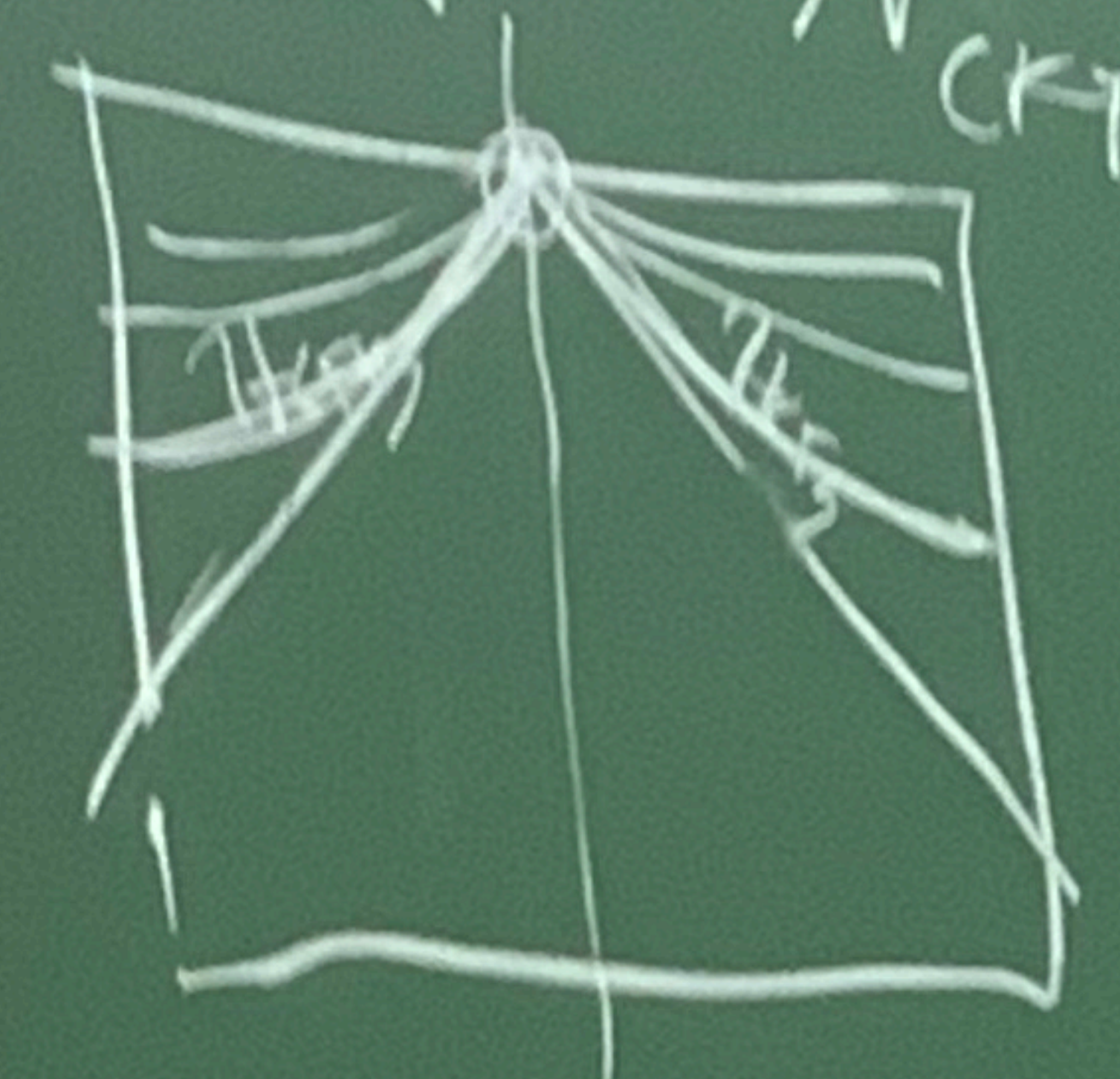
$\hat{\phi}_B^{\pm \omega N} = \langle \phi_B^{\pm \omega N}, \phi^{\pm \omega N} \rangle$

$[\hat{\phi}_A^{\pm \omega N}, \hat{\phi}_B^{\pm \omega N}] = i N_{AB} [\hat{\phi}_A^{\pm \omega N}, \hat{\phi}_B^{\pm \omega N}]$

$\langle \hat{\phi}_A^{\pm \omega N} | 0_F \rangle = \langle \hat{\phi}_B^{\pm \omega N} | 0_F \rangle = 0$
 $|0_P\rangle \quad \langle 0_P | 0_F \rangle = 1$



$\mathcal{H}_{\text{Bulk}} \sim \mathcal{H}_{\text{CFT}_3} \otimes \mathcal{H}_{\text{CFT}_5}$

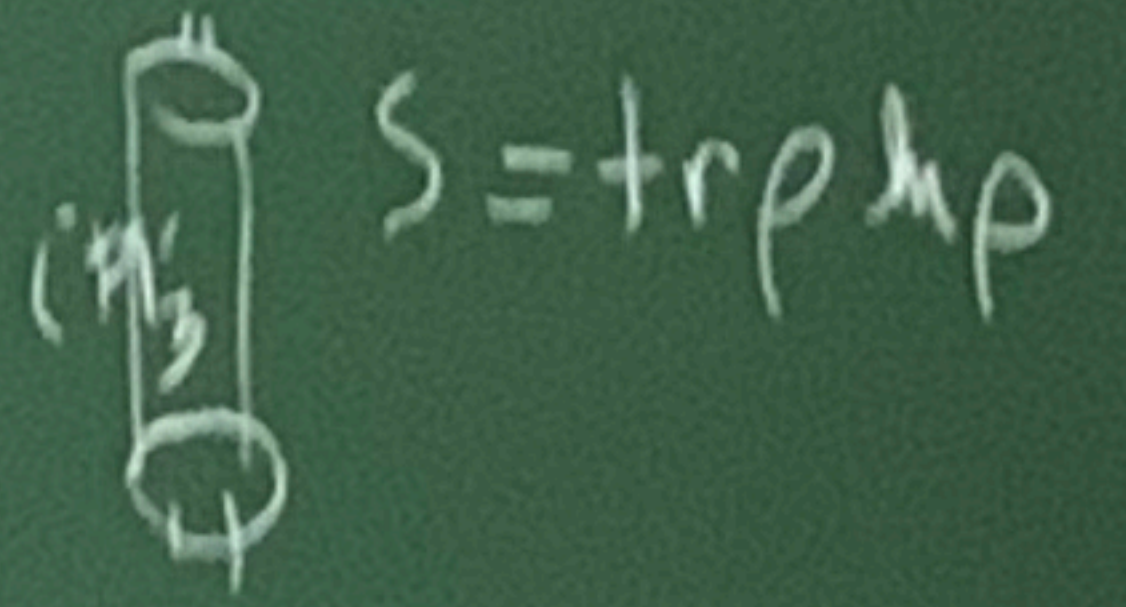


$$|0_E\rangle = e^{i\pi L_0} |0_F\rangle$$

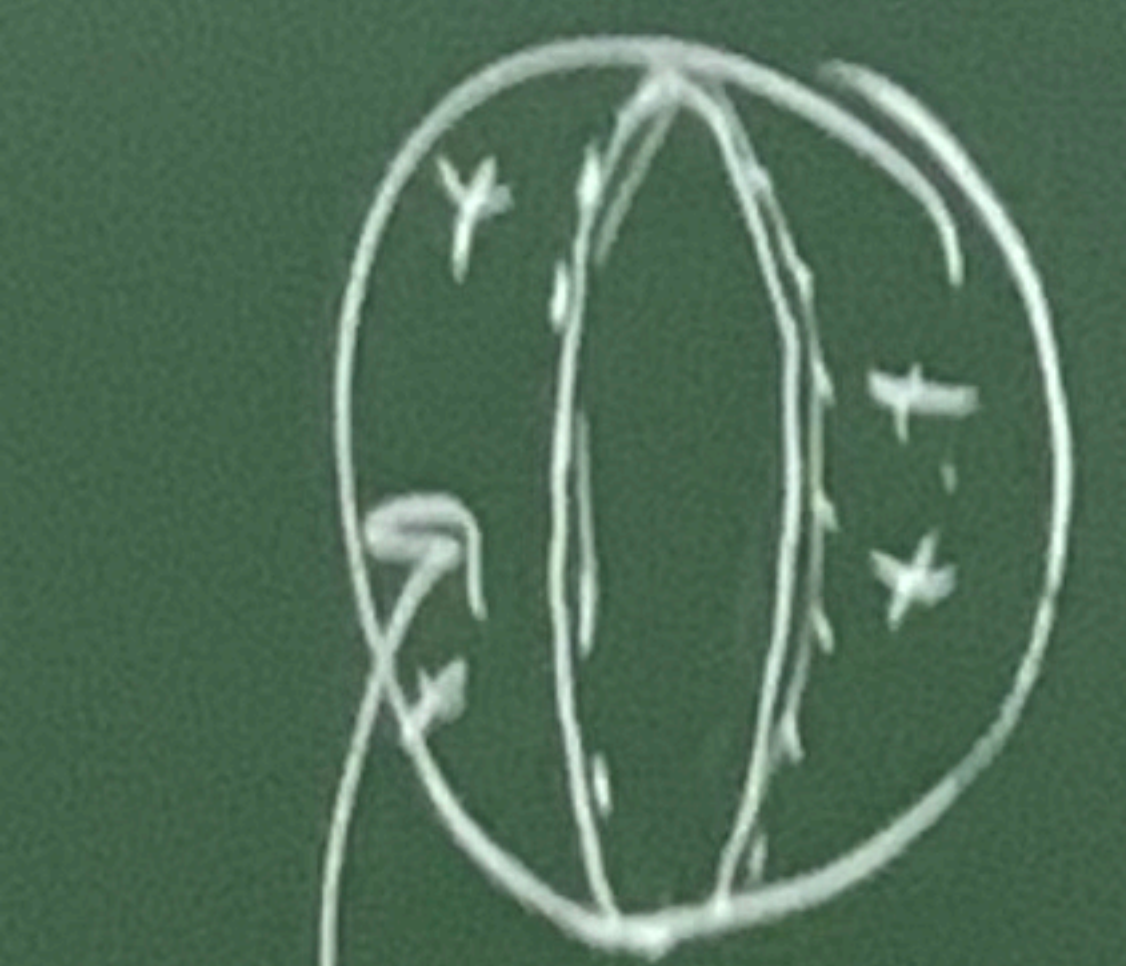
$$\sim |0_P\rangle$$

$$\rho \propto e^{-2\pi H_{\text{static}}}$$

$$\propto e^{-2\pi L_0}$$



$$\hat{\psi}(x) = -i N^{AB} \left[\phi_A^{PS}(x) \phi_B^{FS} + \phi_A^{FS}(x) \phi_B^{PS} + \cancel{\phi_A^{RN}(x) \phi_B^{FN}} + \cancel{\phi_A^{FN}(x) \phi_B^{RN}} \right]$$



$\psi(\phi_1)$

