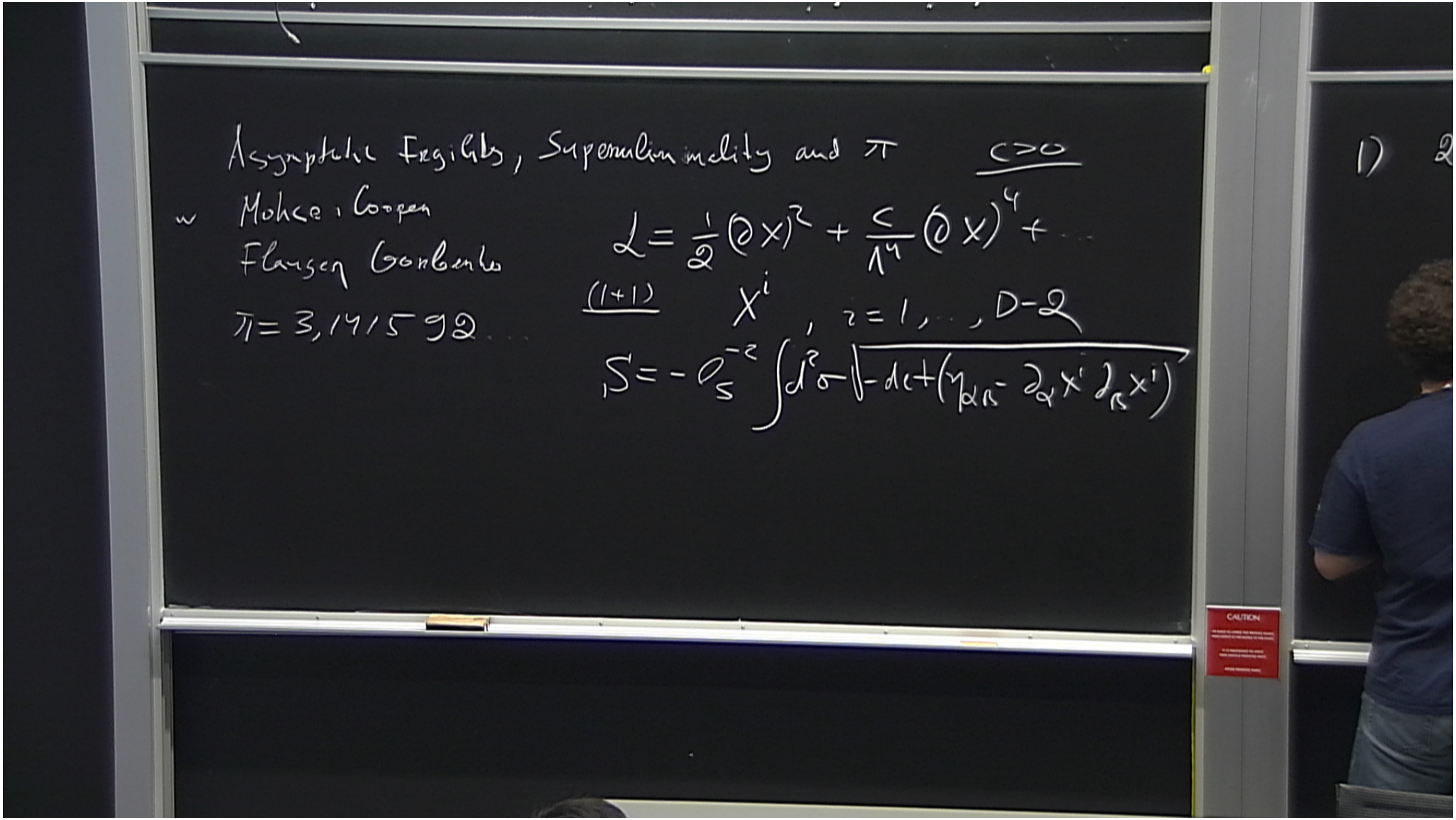
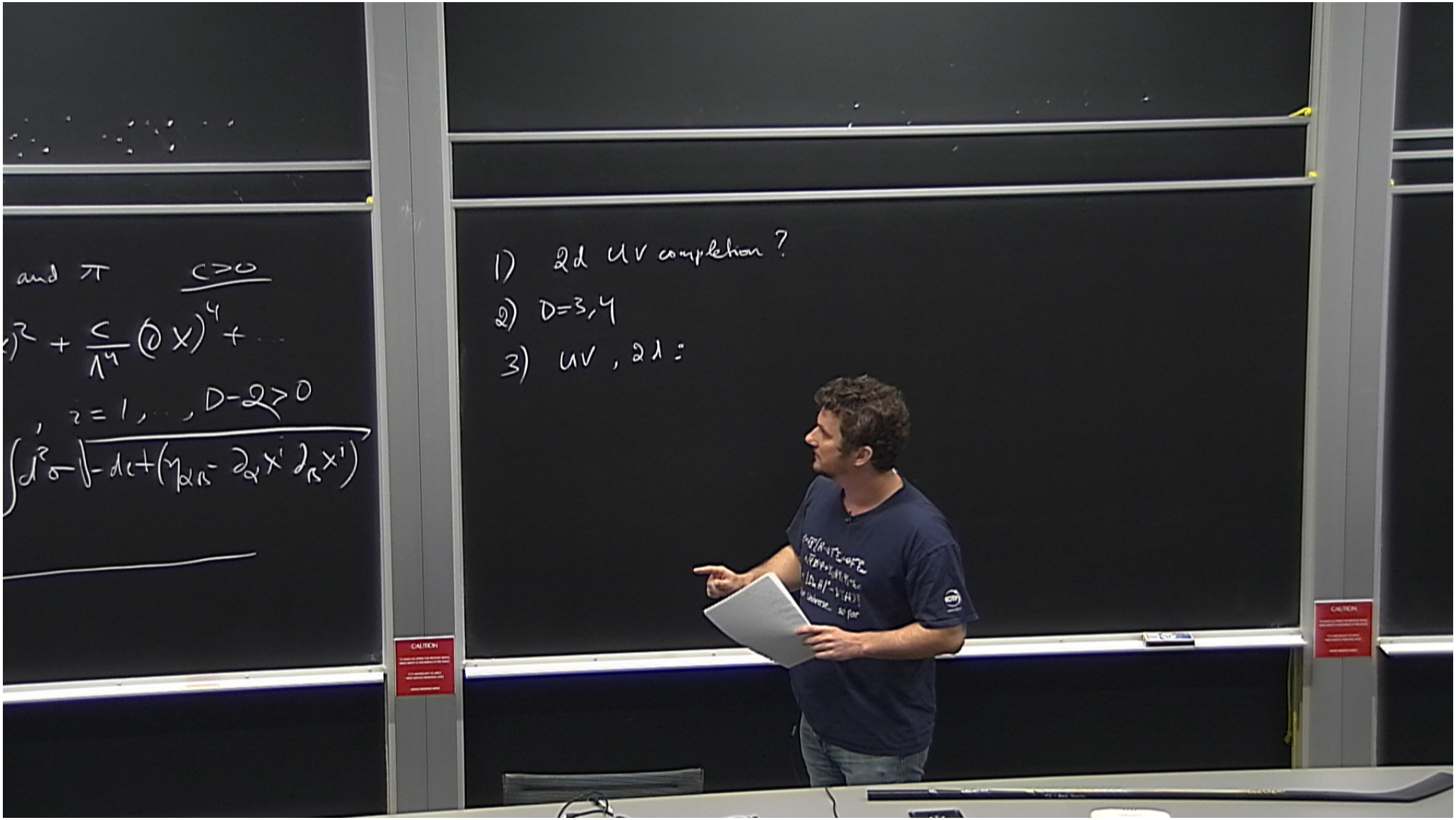
Title: Asymptotic fragility, superluminality and pi

Date: Apr 10, 2015 09:45 AM

URL: http://pirsa.org/15040105

Abstract:


Asymptotic Freedom, Superconformality and π
c>0
w Mohca, Cooper
Flauger Goodenbo
π = 3,1415 92...
$\mathcal{L} = \frac{1}{2}(\partial X)^2 + \frac{c}{\Lambda^4}(\partial X)^4 + \ldots$
(1+1) X^i, $i = 1, \ldots, D-2$
$S = -\sigma_s^{-2} \int d^2\sigma \sqrt{-\det(\eta_{\alpha\beta} \partial_\alpha X^i \partial_\beta X^i)}$
CAUTION


and π c>0
$\frac{c}{\Lambda^4}(\partial X)^4 +$
$i = 1, \ldots, D-2 > 0$
$\int d^2\sigma \sqrt{-\det(\eta_{\alpha\beta} \partial_\alpha X^i \partial_\beta X^i)}$
1) 2d UV completion ?
2) D=3,4
3) UV, 2d :
CAUTION
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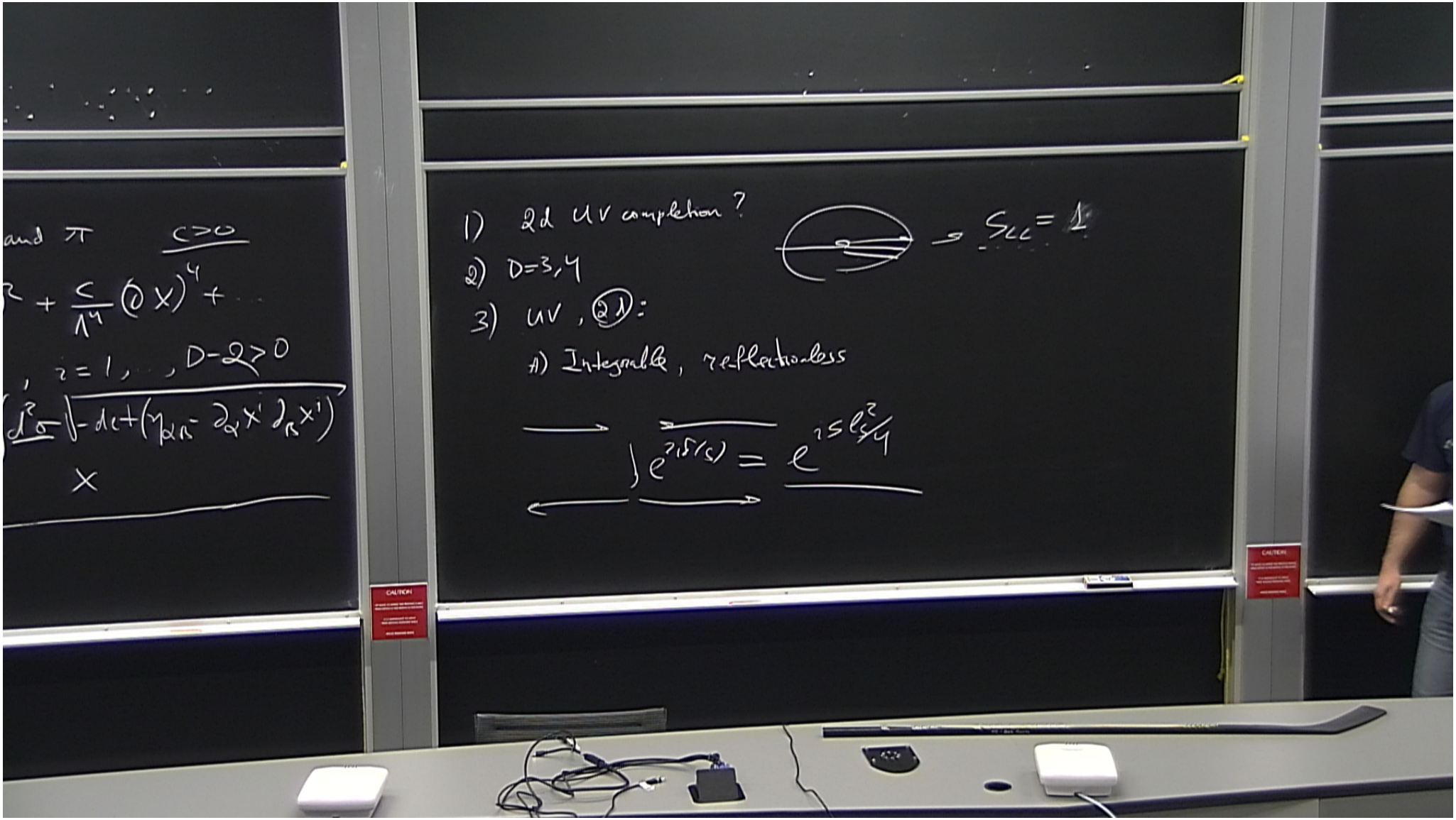
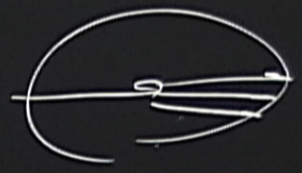

1) 2d UV completion?
2) D=3,4
3) UV, (2,1):
A) Integrable, reflectionless
$|e^{2i\delta(s)}| = e^{2\pi s l_s^2/4}$
$S_{cc} = 1$
$\frac{c}{\Lambda^4}(\partial X)^4 +$
$D-2>0$
$\sqrt{-dt+(\eta_{\mu\nu}-\partial_\mu X^i \partial_\nu X^i)}$

1) 2d UV completion?

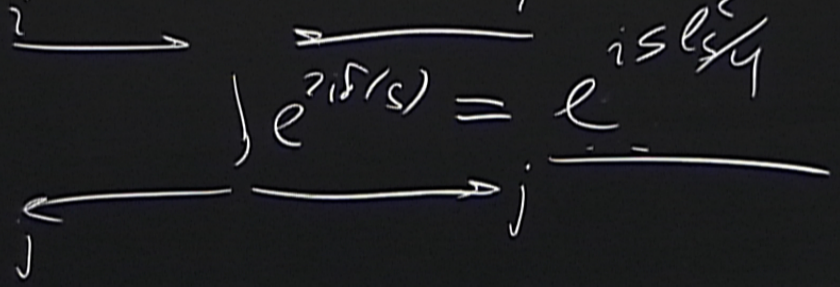
2) D=3,4

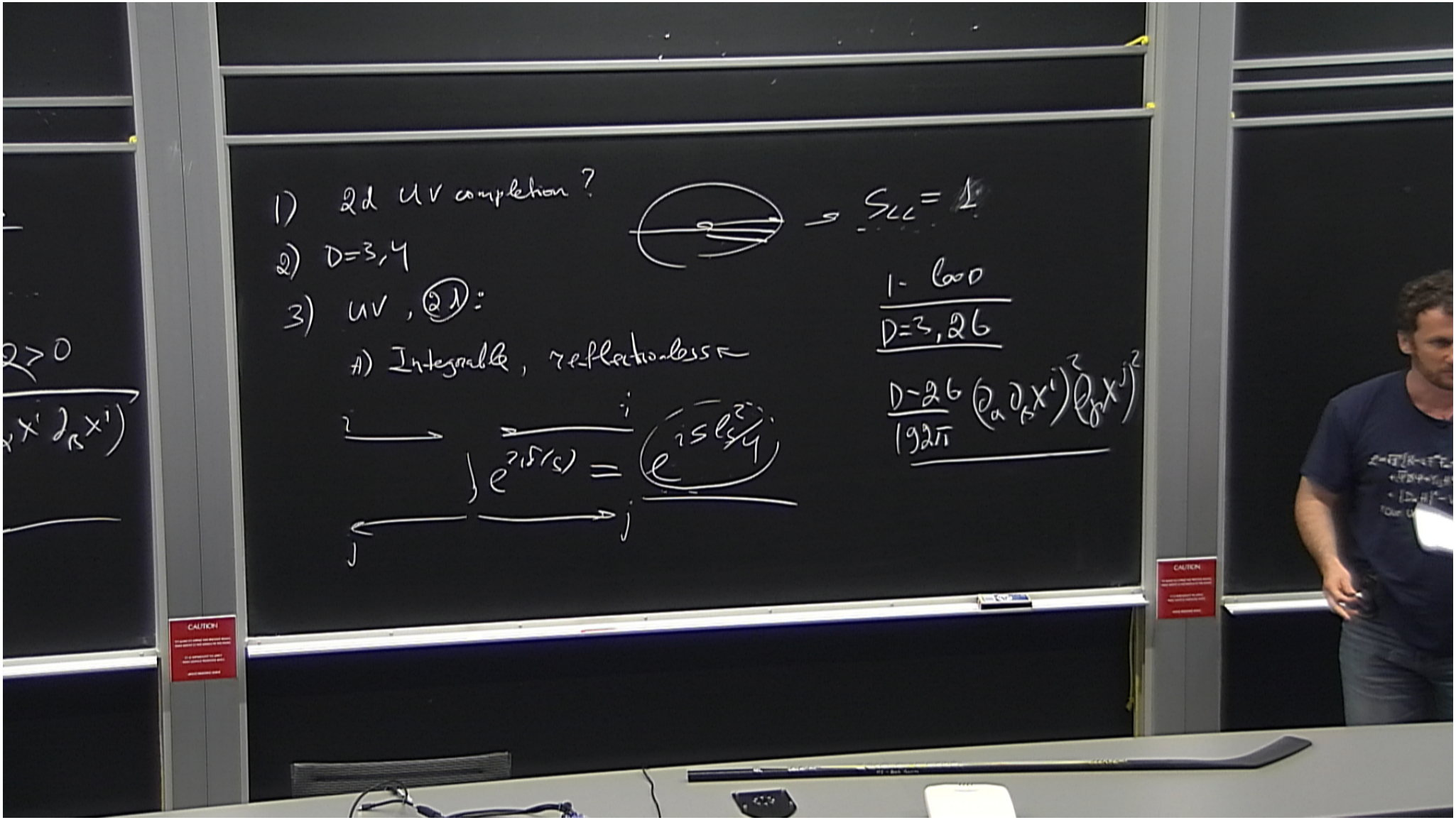
3) UV, (21):

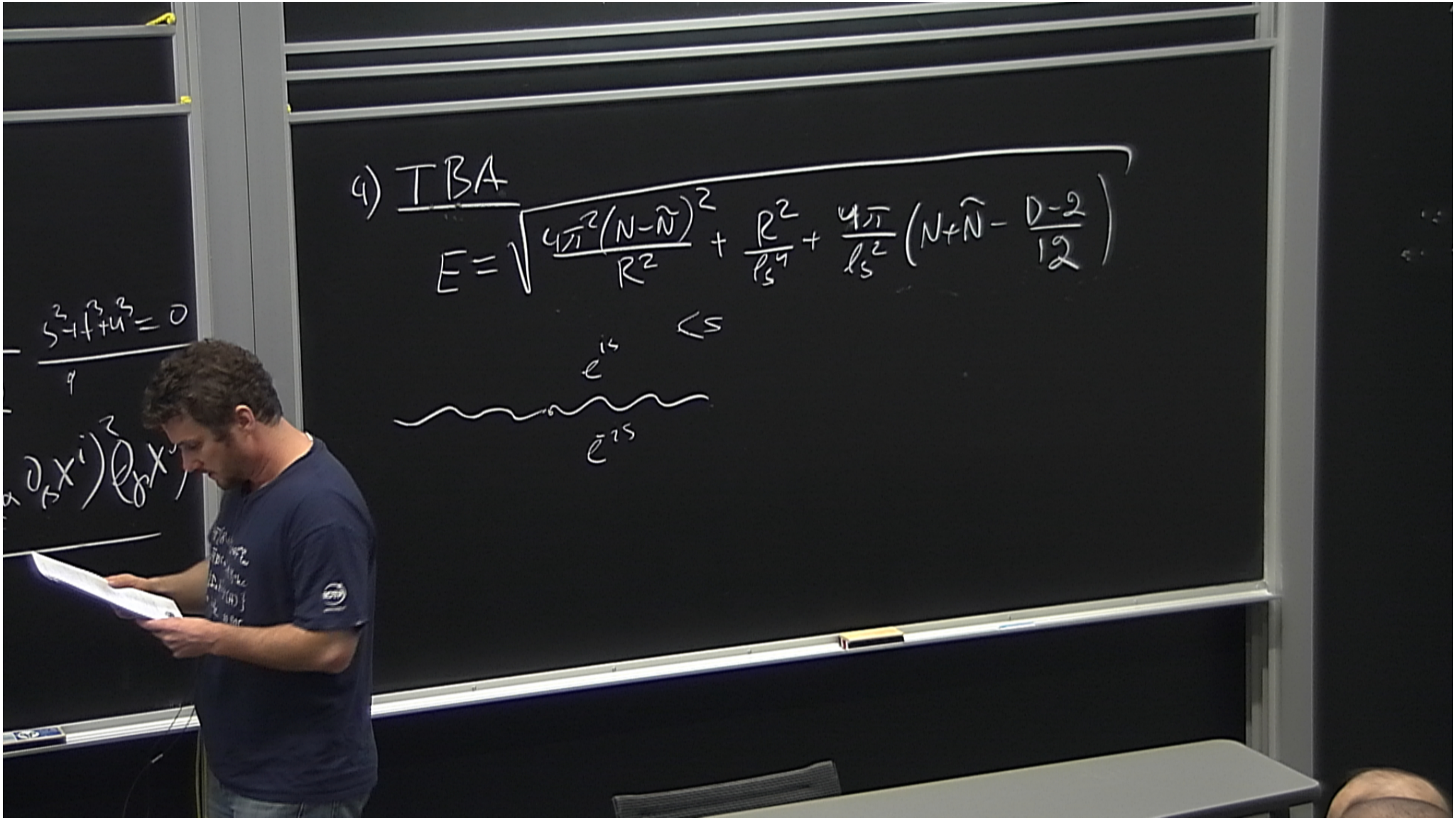
A) Integrable, reflectionless

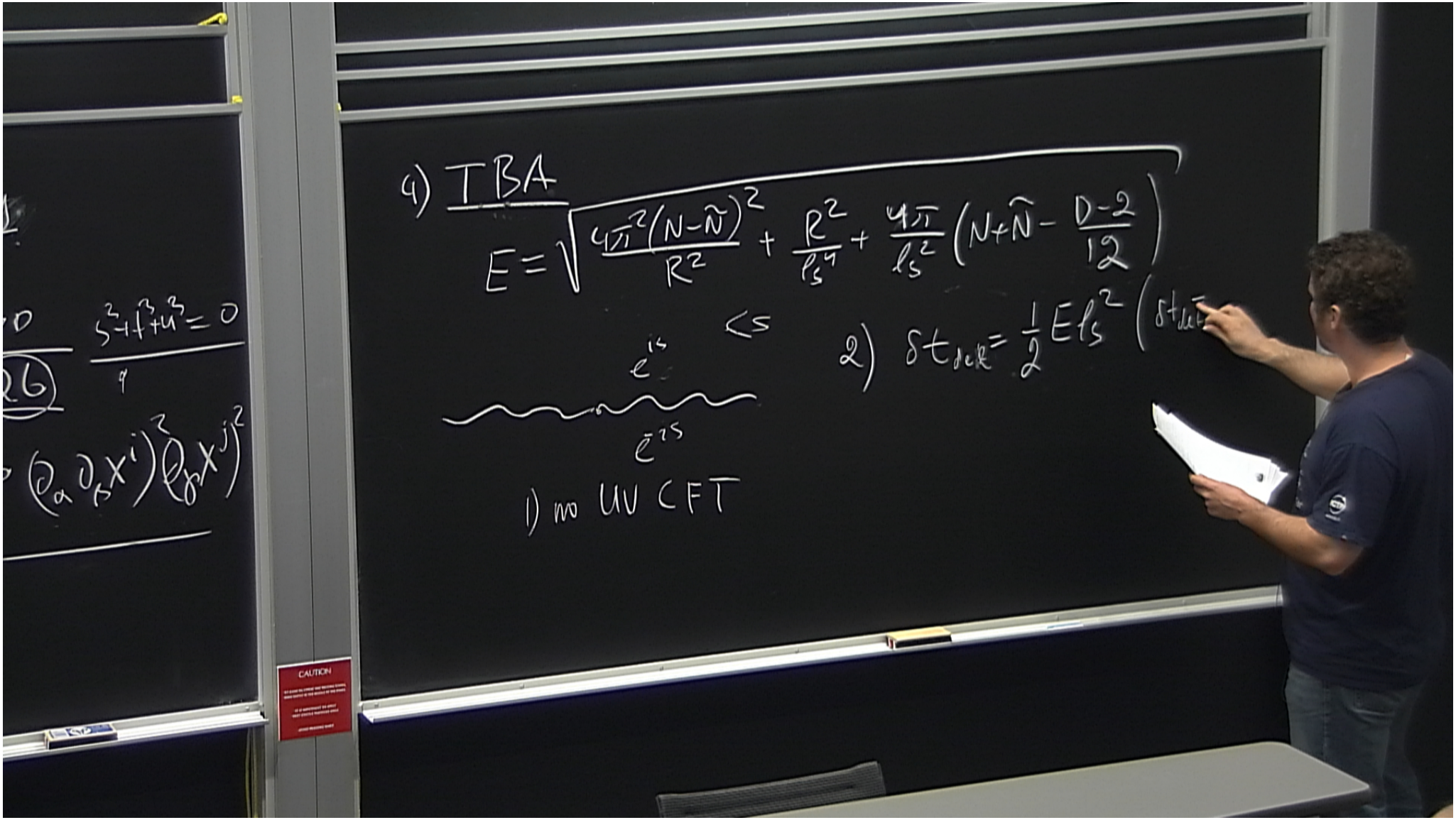


$\Rightarrow S_{cl} = 1$




1) 2d UV completion?
2) D=3,4
3) UV, (2):
*) Integrable, reflectionless
$S_{LL} = 1$
1- loop
D=3,26
$\frac{D-26}{192\pi}(\partial_\alpha \partial_\beta X^i)^2(\partial_\beta X^j)^2$
$e^{2iS(s)} = e^{2is\ell_s^2/4}$
CAUTION


4) TBA
$E = \sqrt{\frac{4\pi^2 (N-\tilde{N})^2}{R^2} + \frac{R^2}{l_s^4} + \frac{4\pi}{l_s^2}\left(N+\tilde{N} - \frac{D-2}{12}\right)}$
e^{ik}
e^{2is}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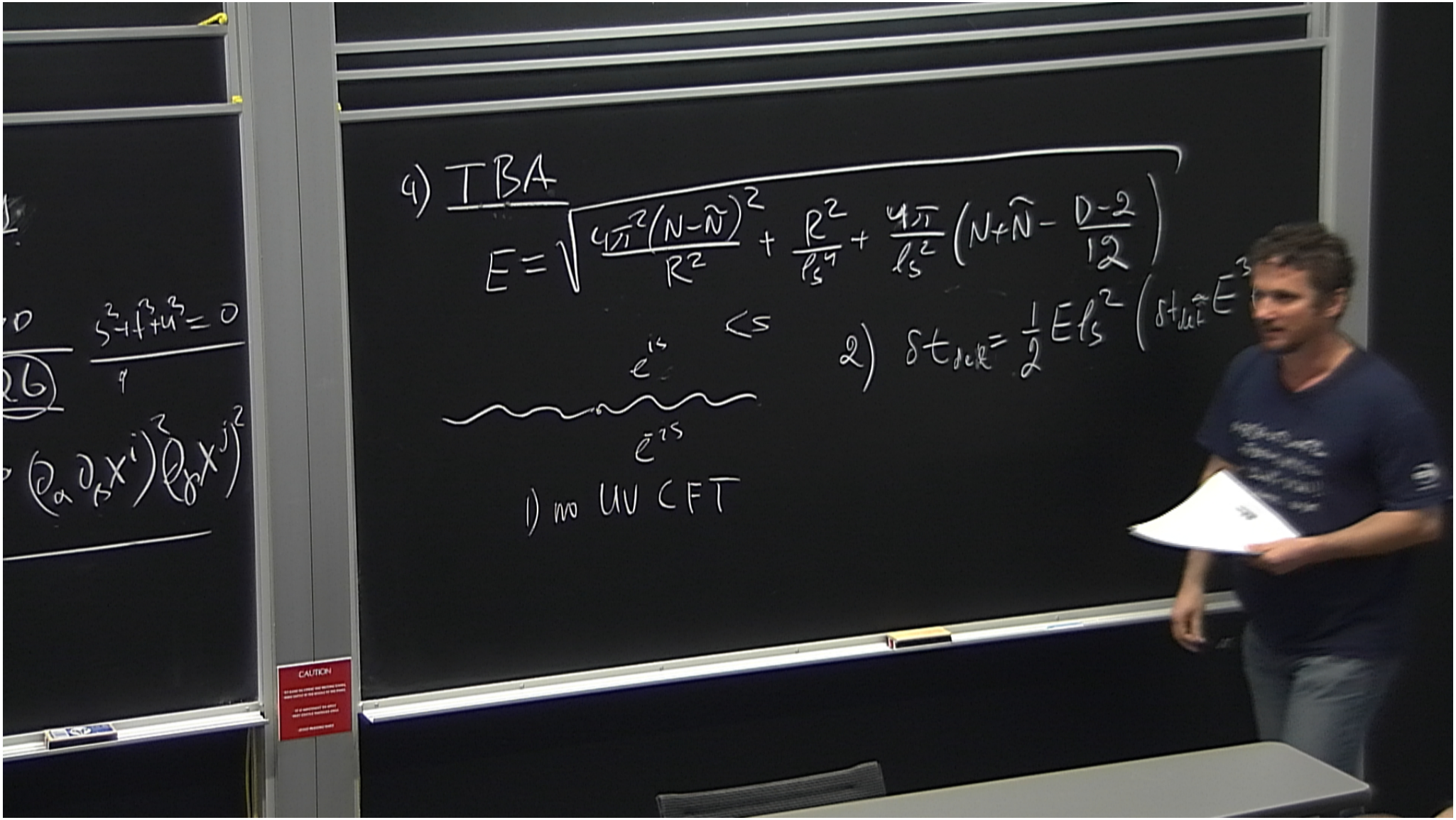
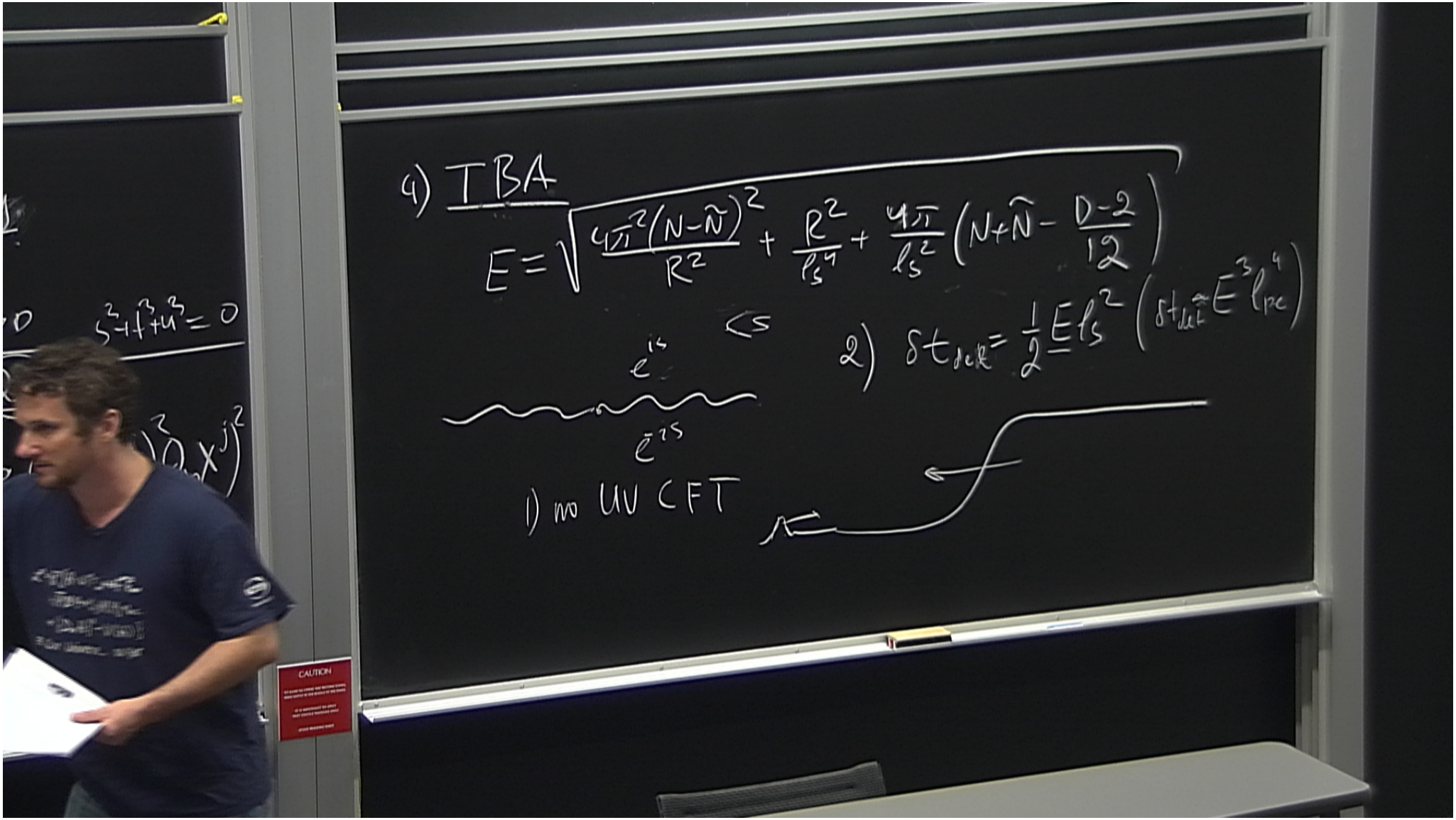
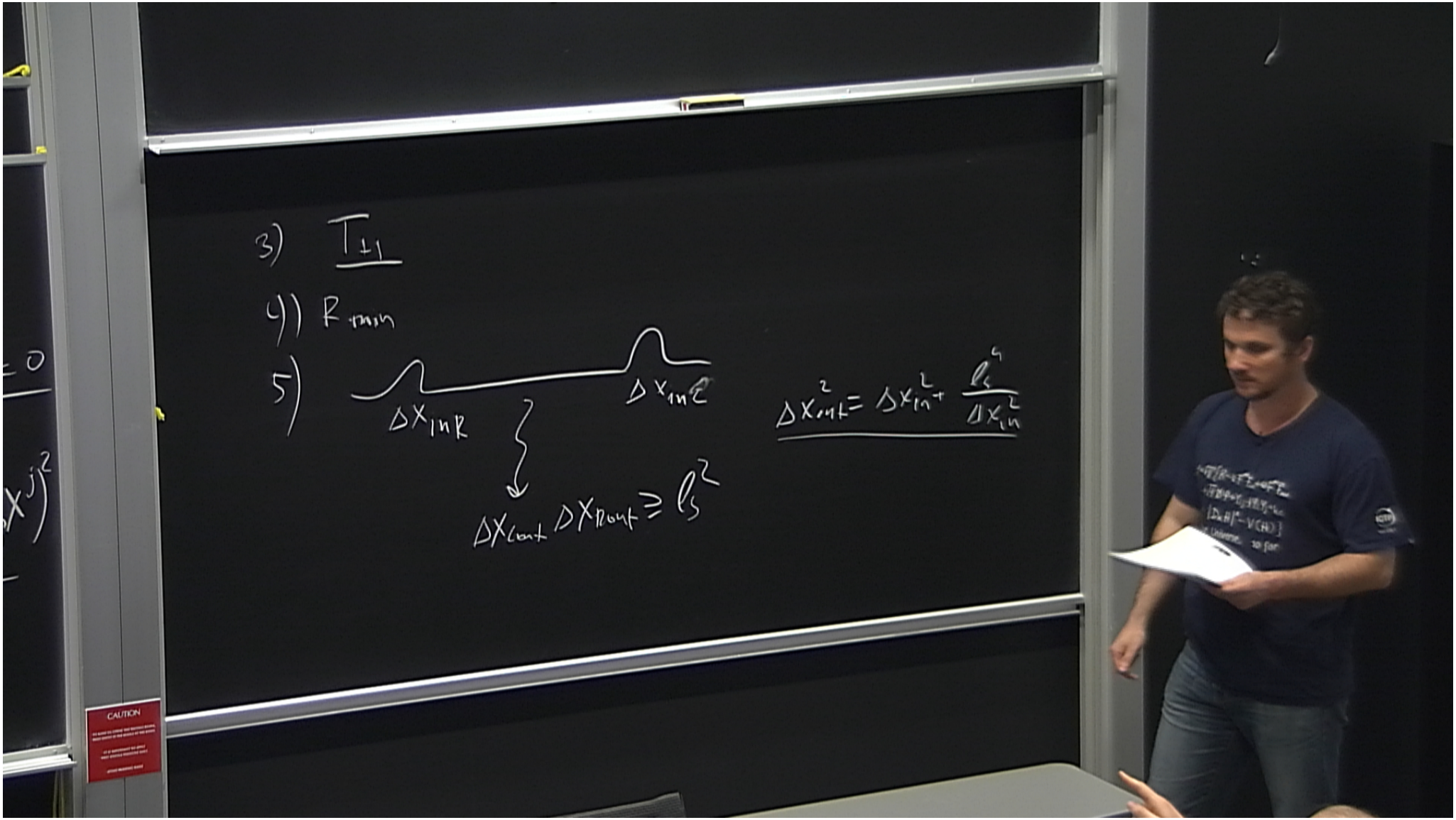
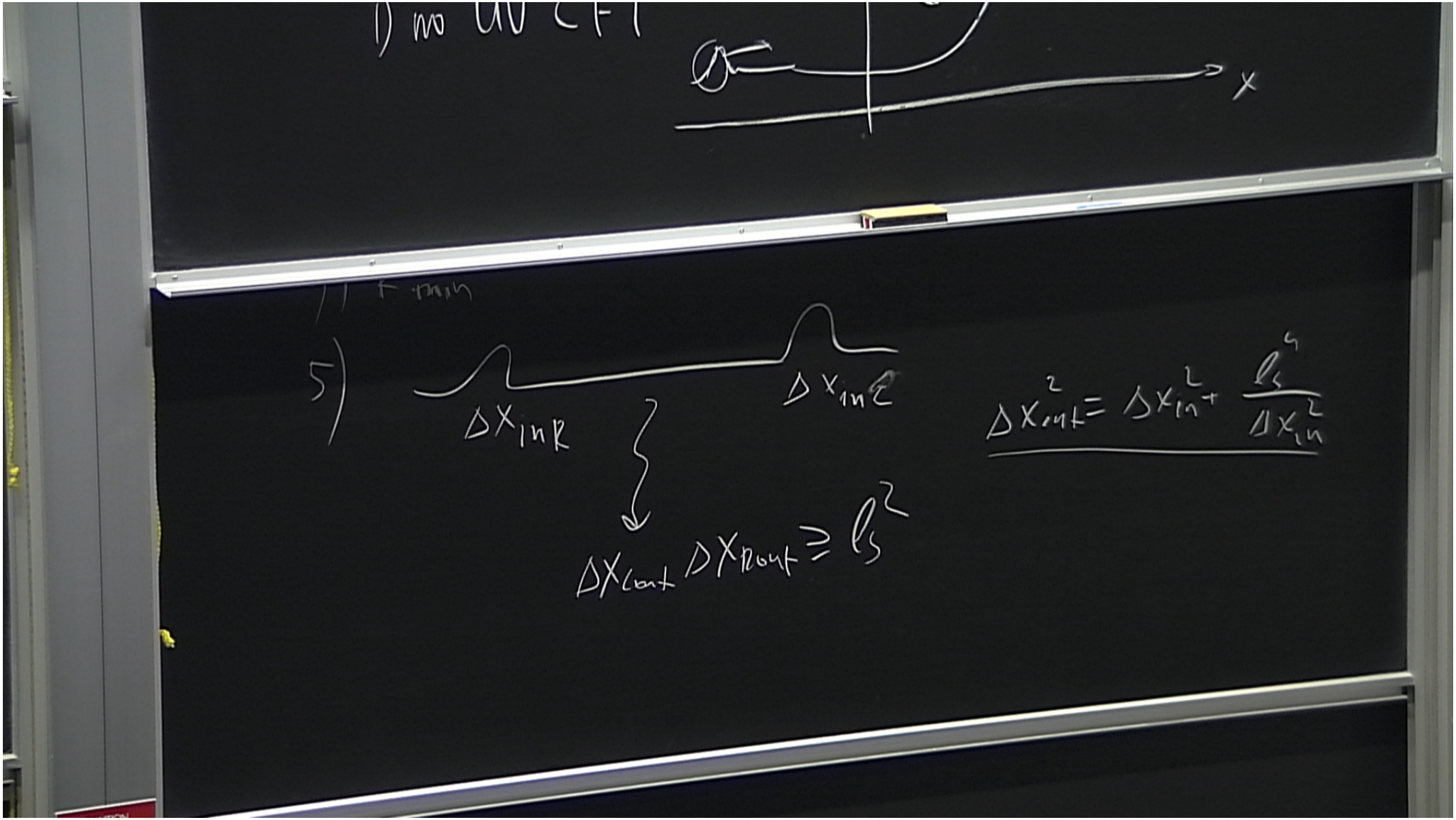
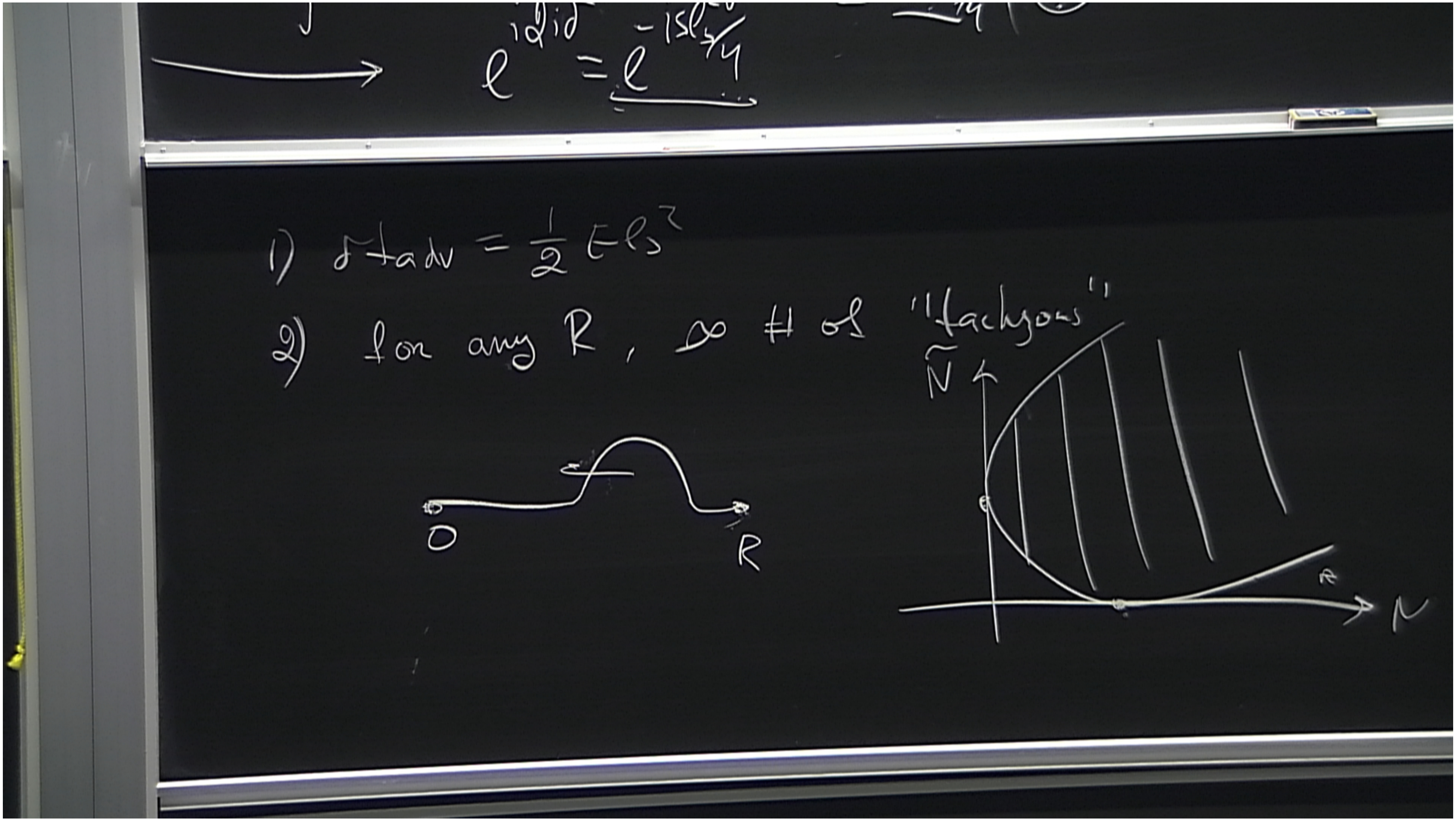
e^{is}
e^{2is}
2) $\delta t_{det} = \frac{1}{2} E \ell_s^2 \left(\delta t_{det}\right.$
1) no UV CFT
CAUTION

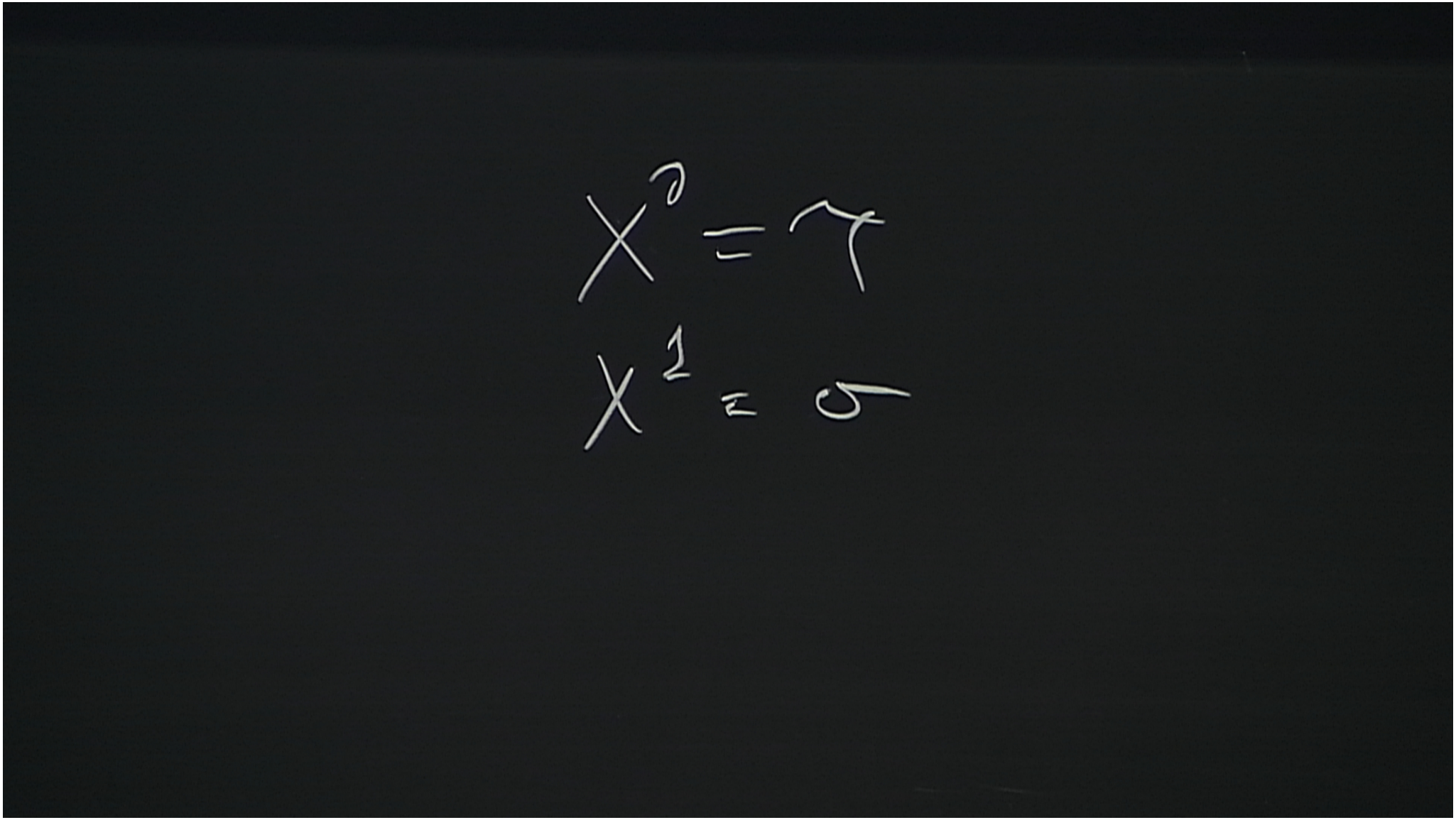

4) TBA
$E = \sqrt{\frac{4\pi^2(N-\tilde{N})^2}{R^2} + \frac{R^2}{\ell_s^4} + \frac{4\pi}{\ell_s^2}\left(N+\tilde{N} - \frac{D-2}{12}\right)}$
e^{is} <s
e^{2s}
1) no UV CFT
2) $\delta t_{ik} = \frac{1}{2} E \ell_s^2 \left(\delta t_{ik} \hat{E}^3\right.$
$\frac{s^3+t^3+u^3=0}{4}$
$(\partial_\alpha \partial_\beta X^i)^3 (\partial_\beta X^j)^2$
CAUTION


4) TBA
$E = \sqrt{\frac{4\pi^2(N-\tilde{N})^2}{R^2} + \frac{R^2}{l_s^4} + \frac{4\pi}{l_s^2}\left(N+\tilde{N} - \frac{D-2}{12}\right)}$
e^{is}
$\bar{e}^{is}$
1) no UV CFT
2) $\delta t_{dec} = \frac{1}{2} E l_s^2 \left(\delta t_{dec} \hat{E}^3 l_{pc}^4\right)$
$s^3+t^3+u^3=0$
CAUTION


3) $I_{\pm 1}$
4) R_{min}
5)
$\Delta x_{in R}$
$\Delta x_{in L}$
$\Delta x_{out}^2 = \Delta x_{in}^2 + \frac{\ell_s^4}{\Delta x_{in}^2}$
$\Delta x_{out} \Delta x_{out} \geq \ell_s^2$
CAUTION


x
5)
$\Delta x_{in R}$
$\Delta x_{in L}$
$\Delta x_{out}^2 = \Delta x_{in}^2 + \frac{\ell_s^4}{\Delta x_{in}^2}$
$\Delta x_{out} \Delta x_{out} \geq \ell_s^2$


1) δ tadv = 1/2 t l_s^2
2) for any R, ∞ # of "tachyons"
Ñ
N
O
R


$x^2 = 7$
$x^1 = 5$