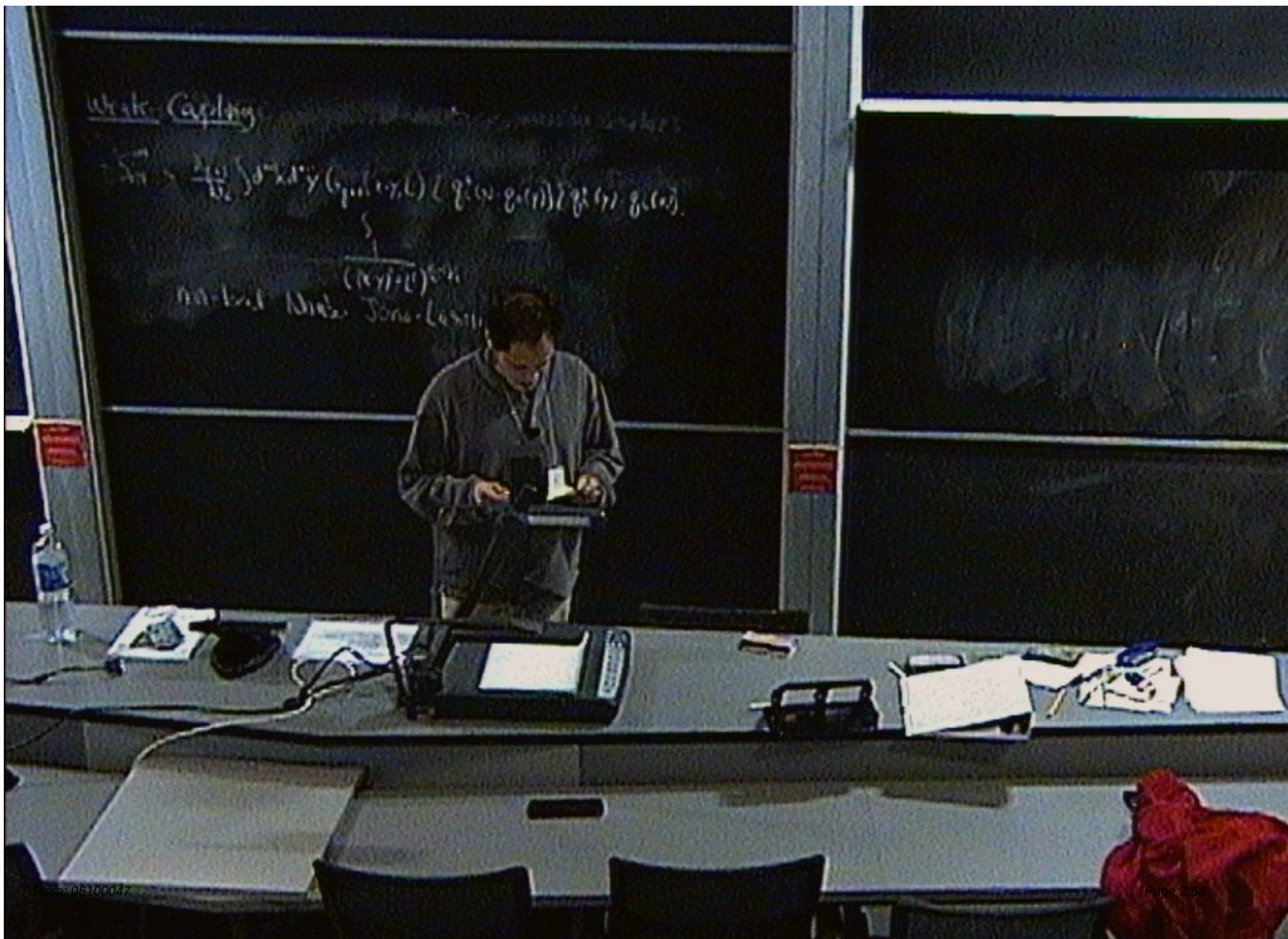


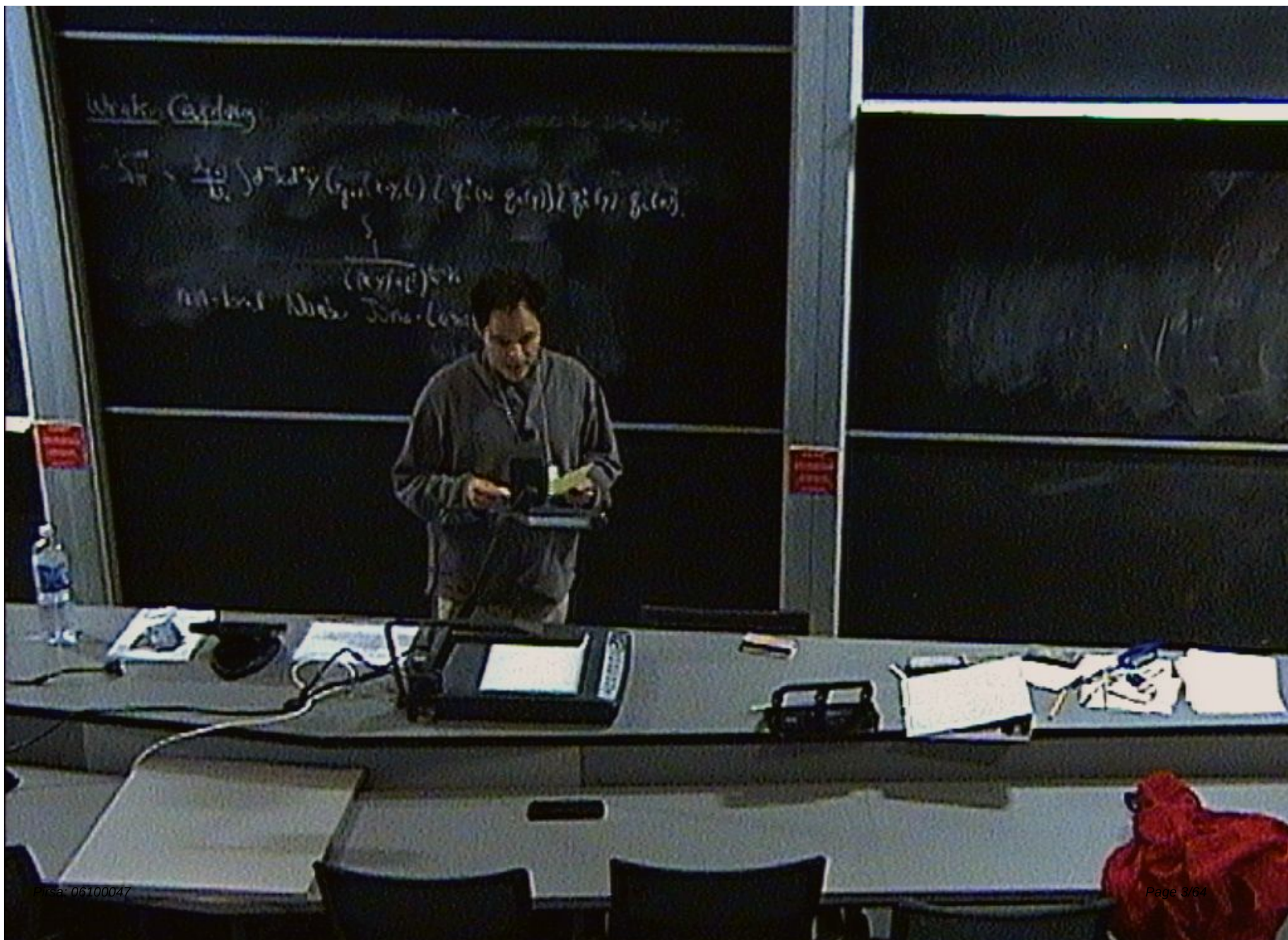
Title: Exact Classical Solutions in String Cosmology

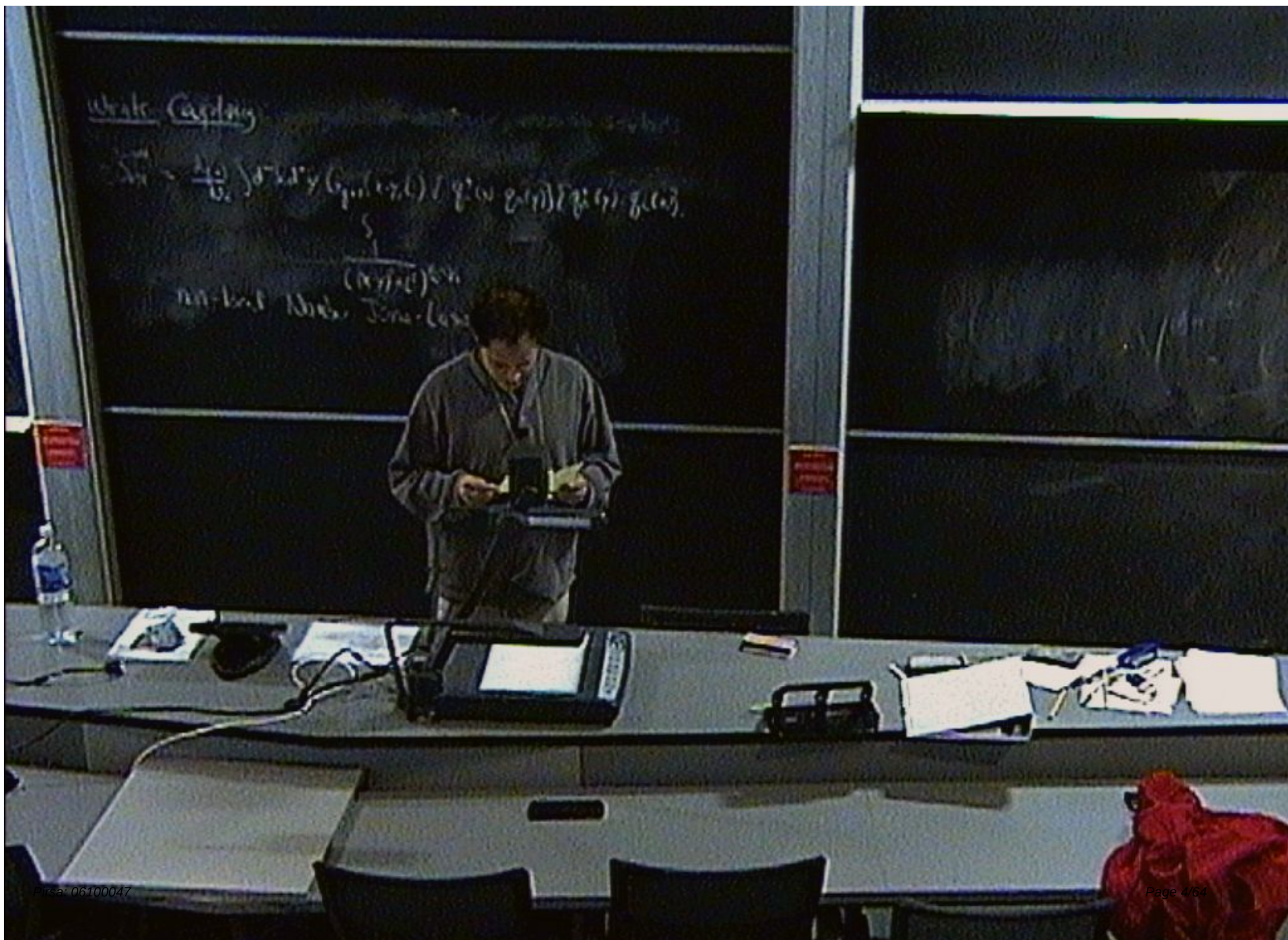
Date: Oct 14, 2006 11:45 AM

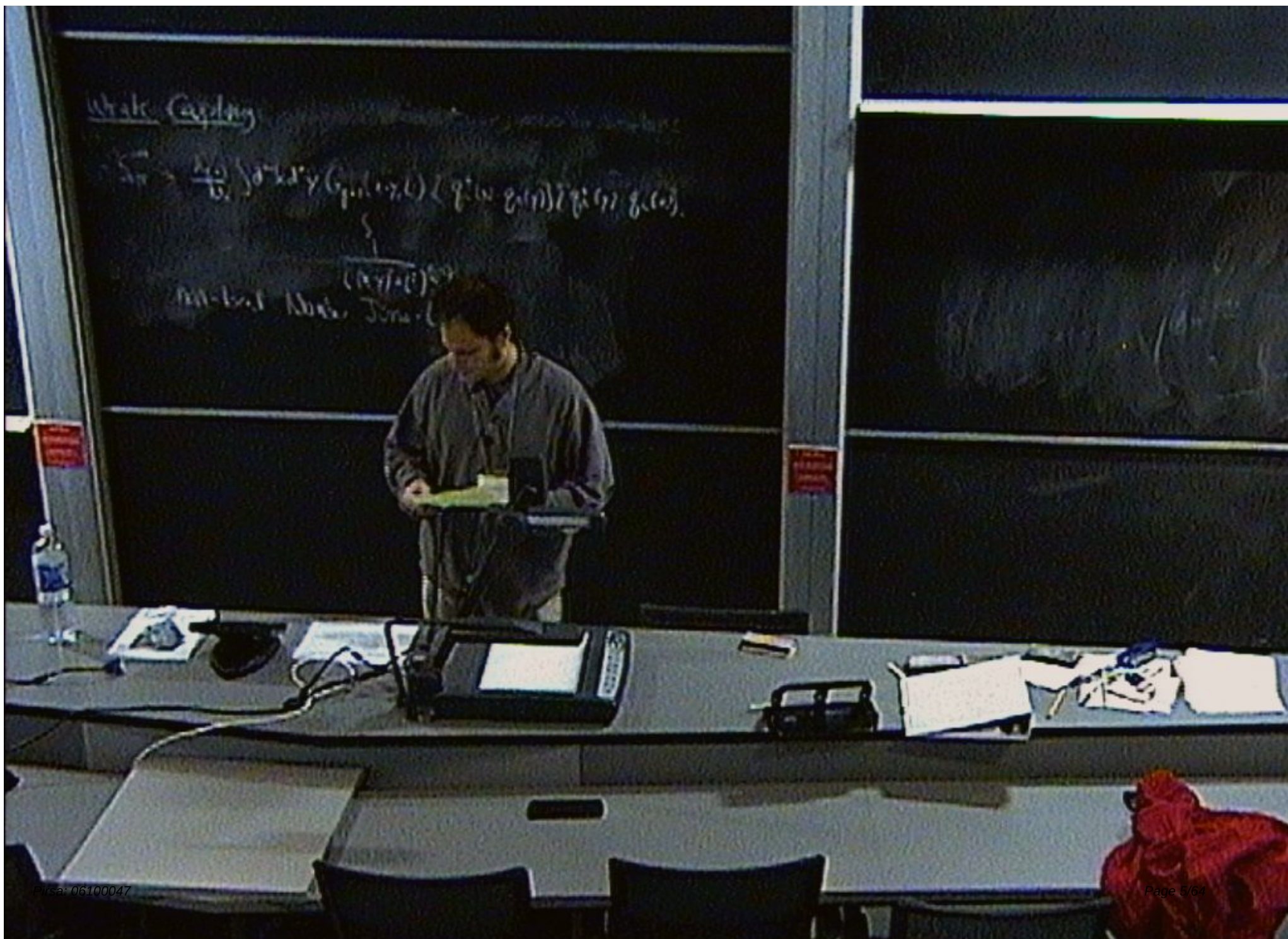
URL: <http://pirsa.org/06100047>

Abstract:





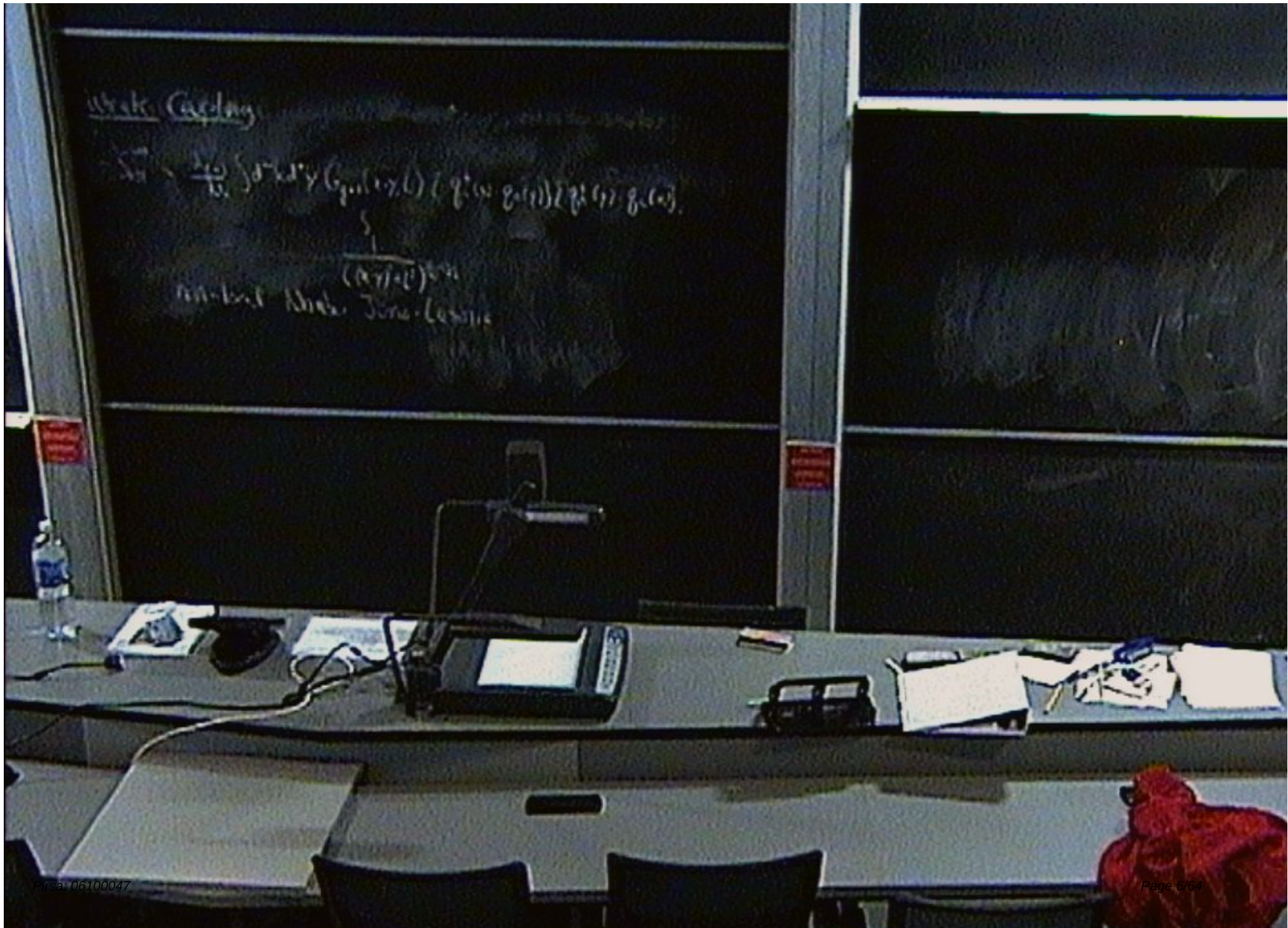




Write Coding

$\sum_{i=1}^n \frac{1}{b_i} \log \gamma(G_i(x)) \leq \log \gamma(G(x))$

$\{ \log \gamma(G_i(x)) \}_{i=1}^n$
not-bad. Note. Some-
thing

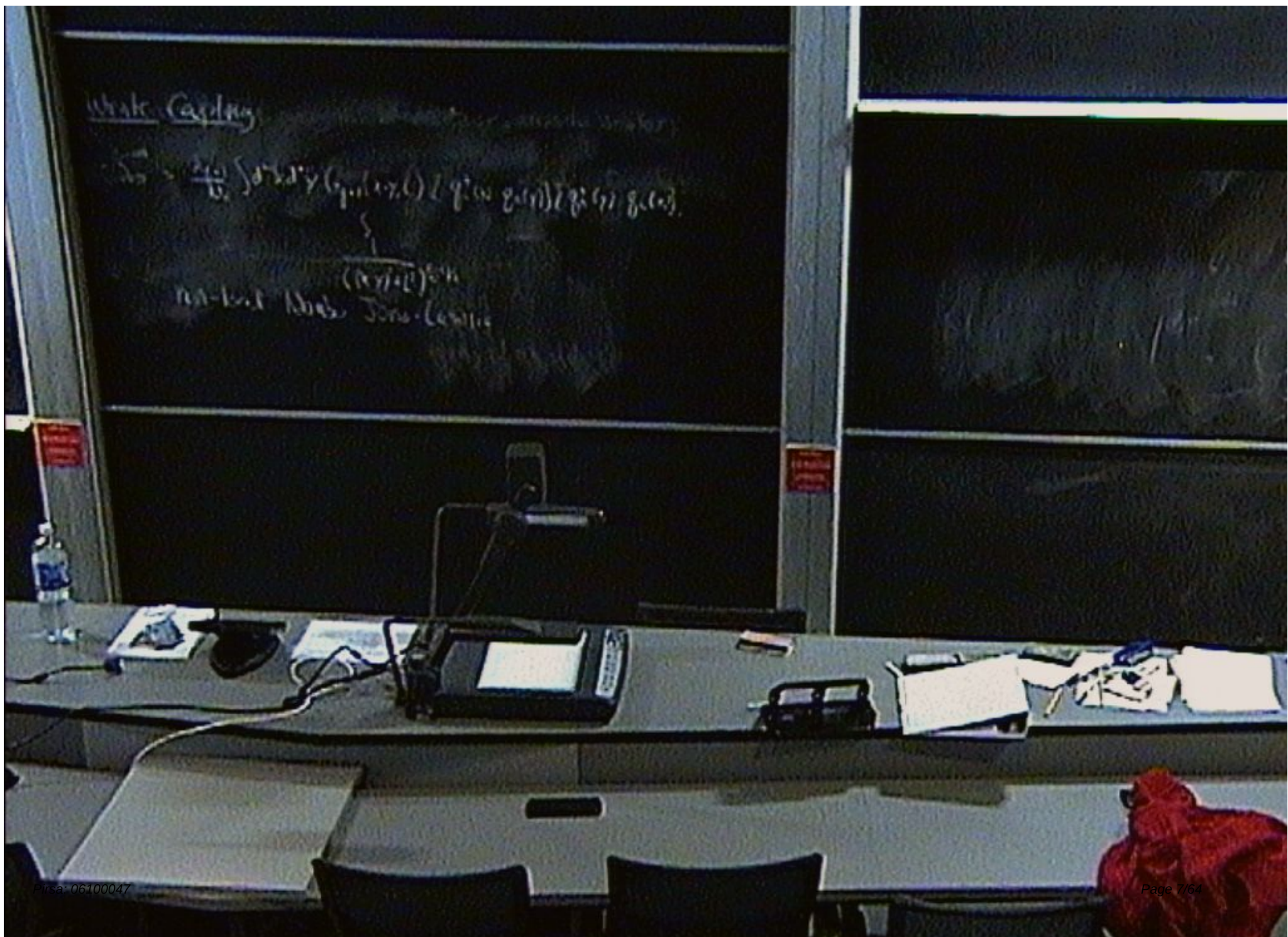


Week 6: Caching

Cache: fast, small, local storage for data

$\frac{1}{(1 + \alpha)^2}$

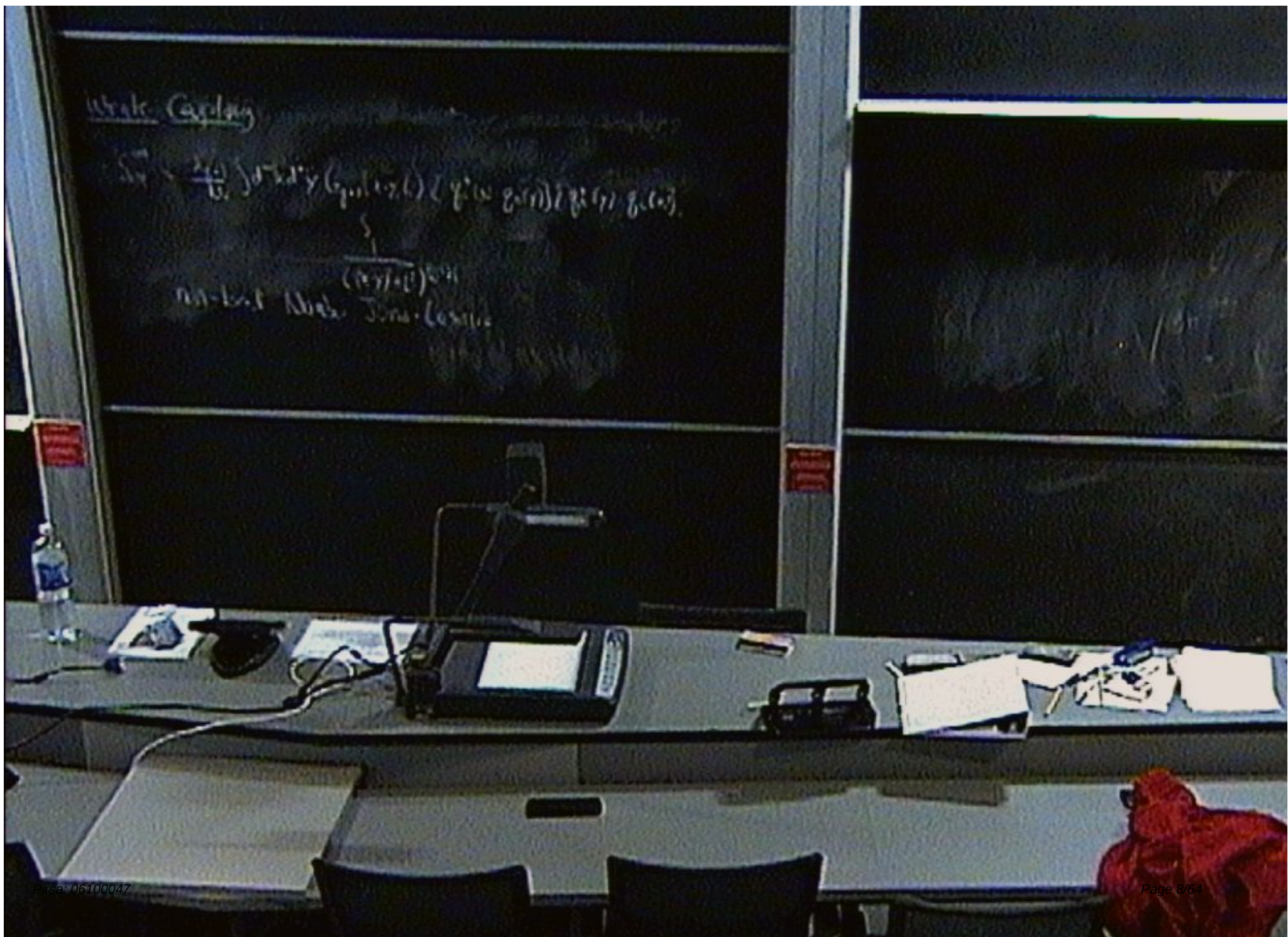
Cache hit: data found in cache



Whole Capital

$$C = \frac{1}{\sqrt{2}} \sqrt{\frac{1}{2} \left(\frac{1}{2} \right)} \left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$$

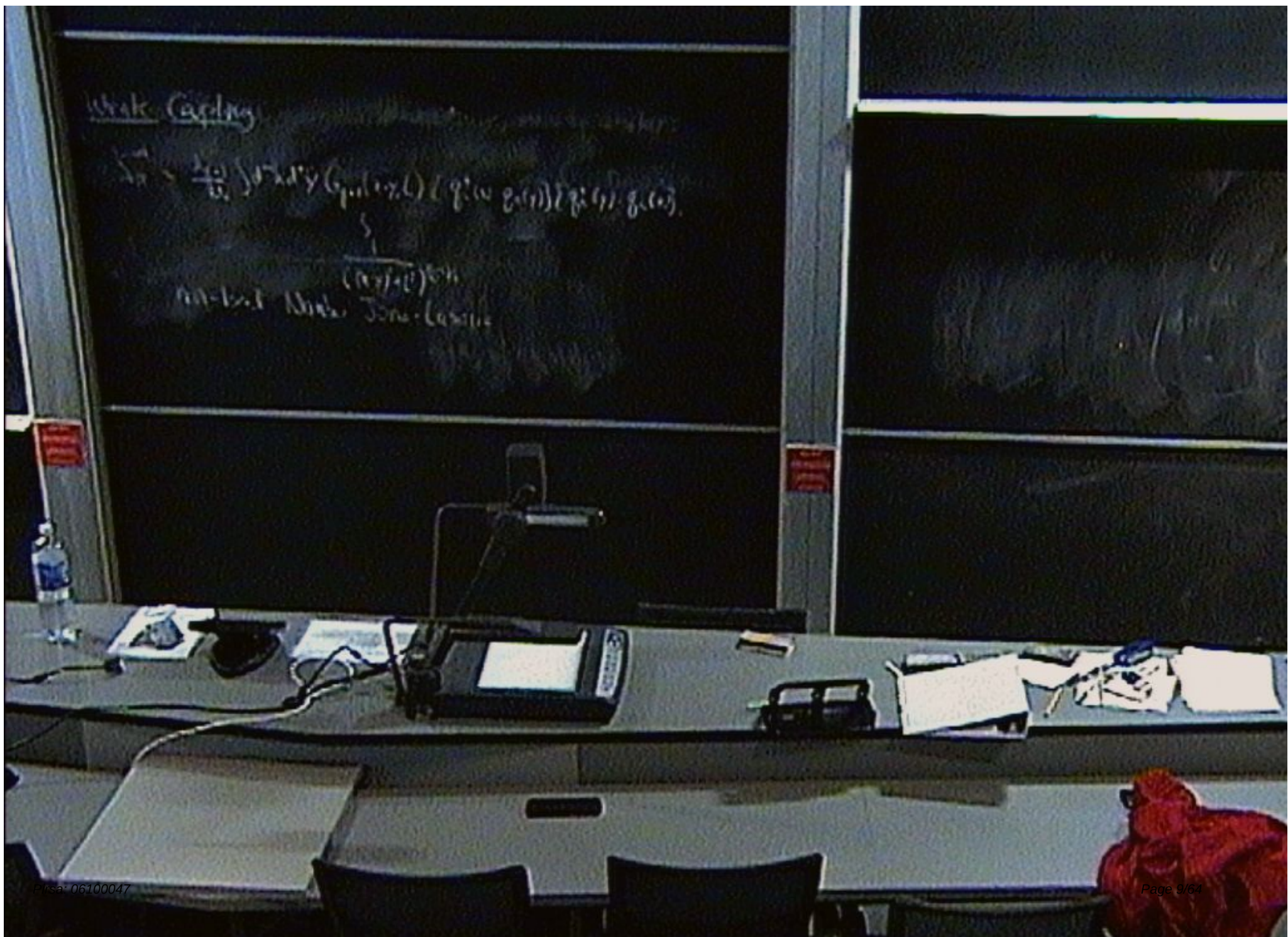
$(\frac{1}{2})^{\frac{1}{2}}$
non-linear time series



Write: Caplan

$$\sum_{i=1}^n \frac{1}{(x_i - a)^2} \cdot f(x_i) \cdot (x_i - a)$$

non-linear Model: Time-Dependent

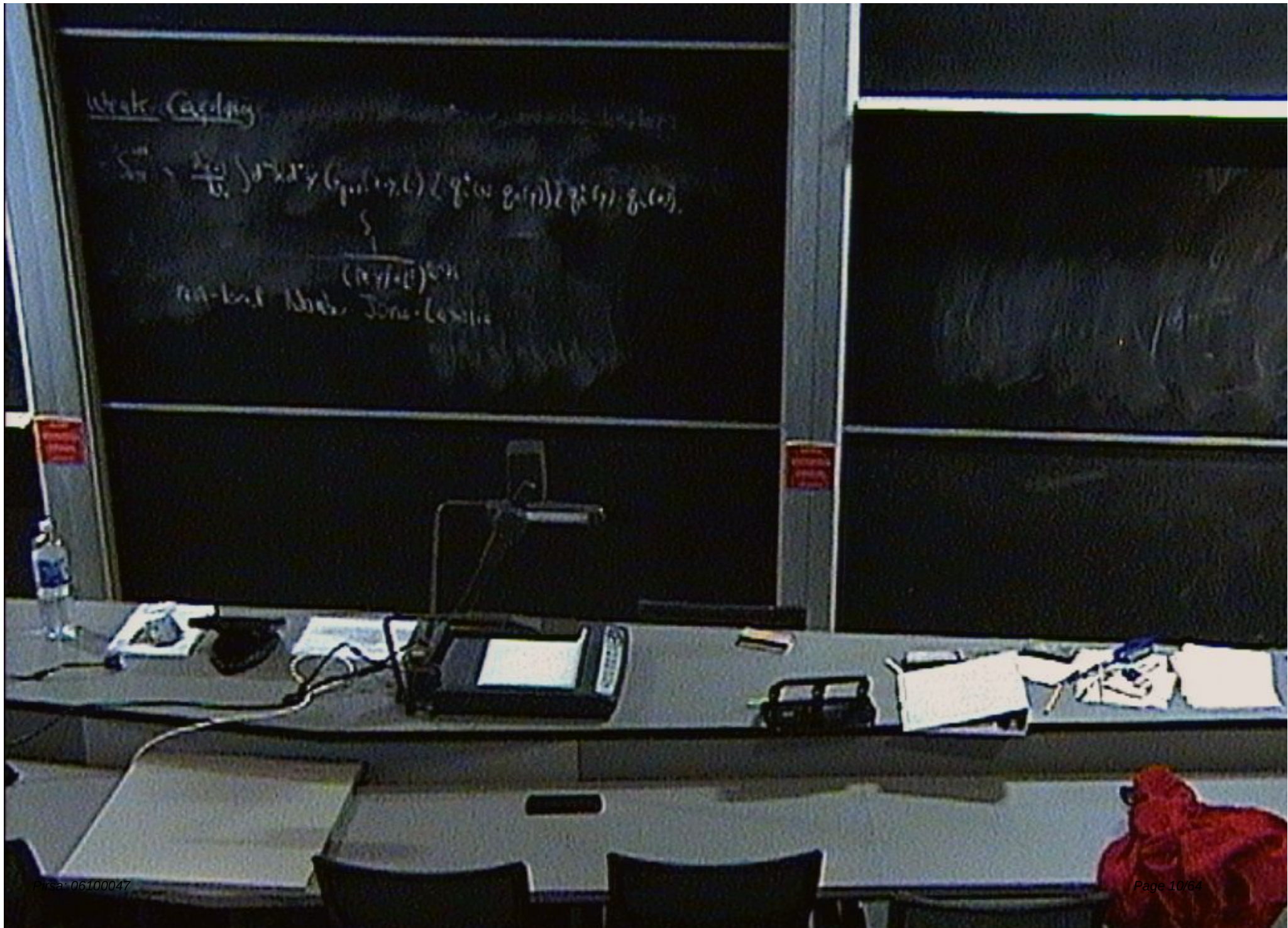


Write Carding

$\sum_{i=1}^n \frac{1}{i^2} \log^2(p_i) (q_i \log p_i + p_i \log q_i)$

$\sum_{i=1}^n \frac{1}{i^2} \log^2(p_i)$

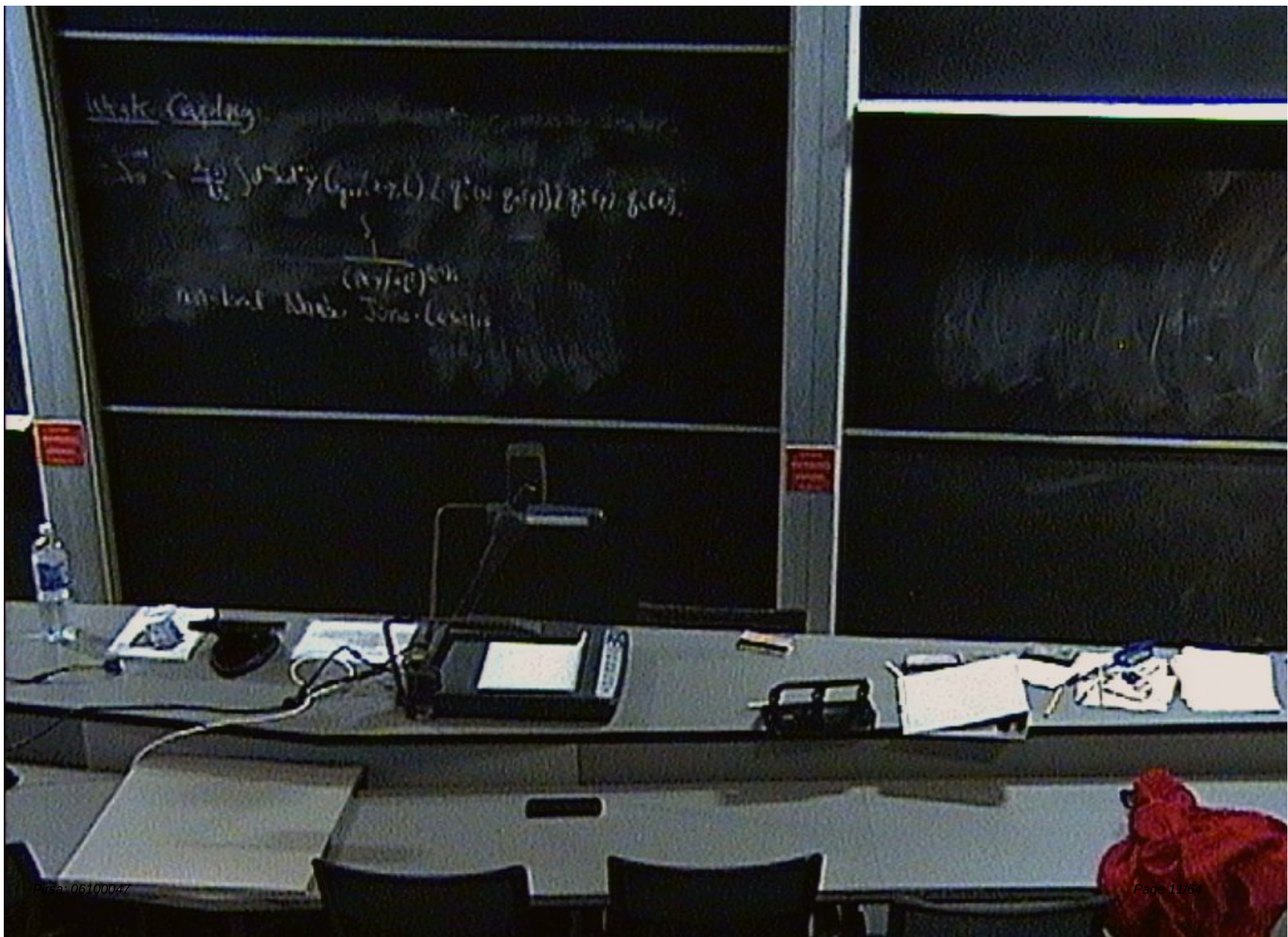
Amal Kumar Jona-Lasinio



Weak Convergence

$$\sum_{n=1}^{\infty} \frac{1}{n^2} \int \int \int \int f(x,y,z,t) (g(x,y,z,t) - g^*(x,y,z,t)) dx dy dz dt$$

$\int \frac{1}{(x,y,z,t)^2} dx dy dz dt$
non-loc. Markov-Jones-Leslie

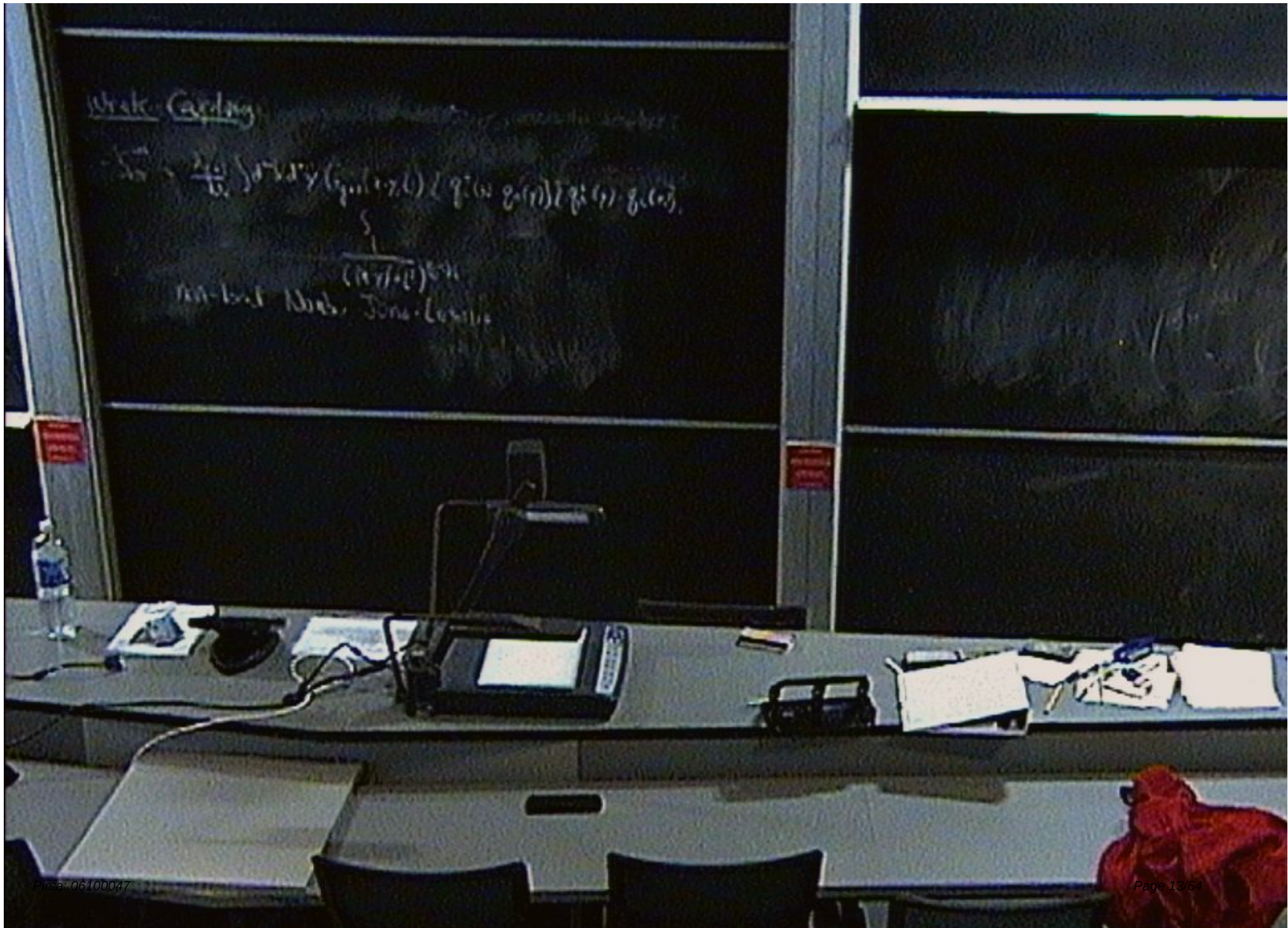


Write Card

$$- \frac{1}{2\pi} \int_0^{2\pi} \int_0^{2\pi} (g_1(x,y)) (g_2(x,y)) (g_3(x,y))$$

$(x,y) \in \mathbb{R}^2$
non-trivial. Non-trivial.





Write Carding

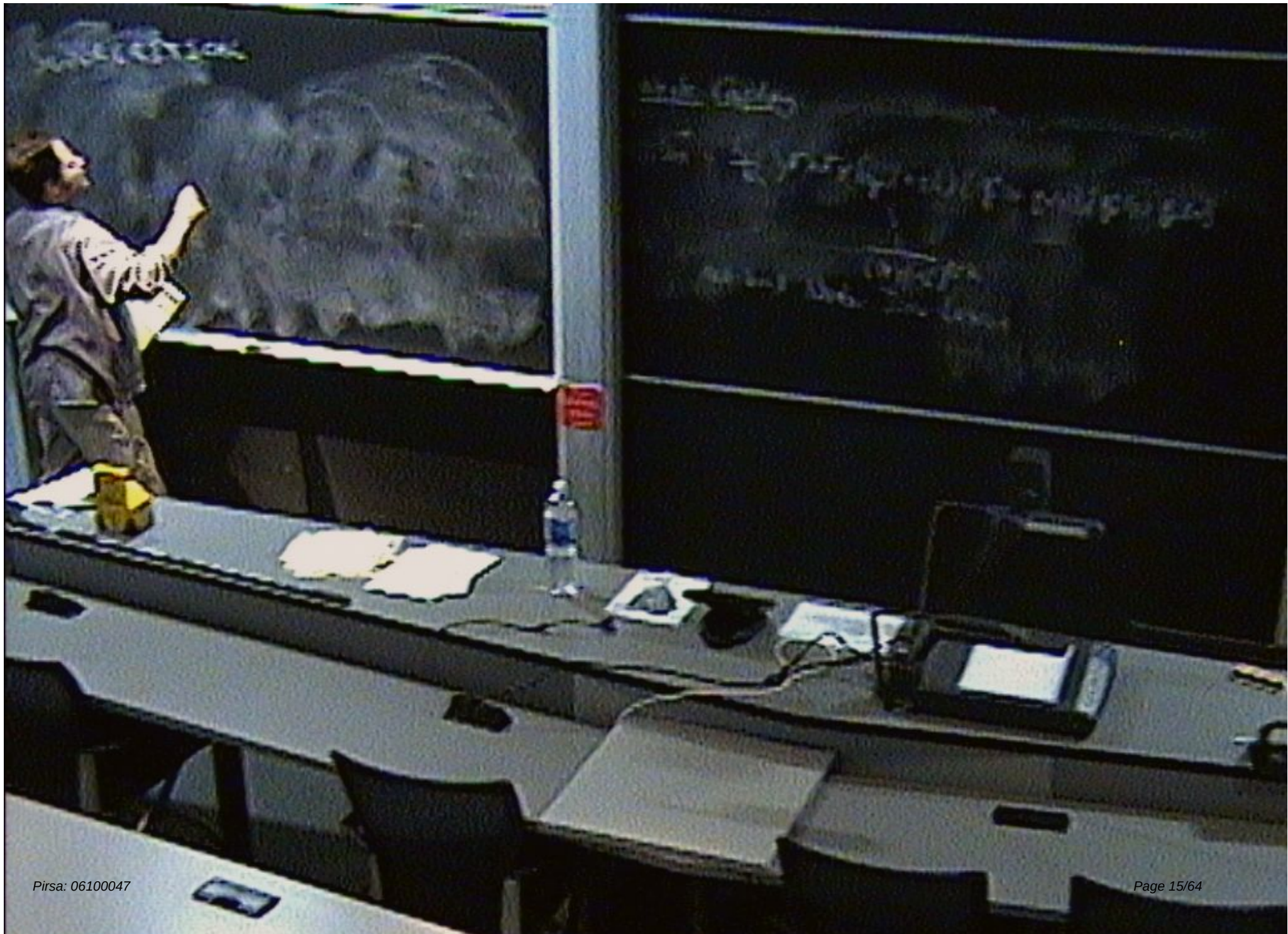
$$S_n = \frac{1}{n} \sum_{i=1}^n \sqrt{g_i(x_i)} / \sqrt{g_i(x_i) + g_i(x_i)}$$

$\frac{1}{(n+1)^2}$
non-loc. Mod. Time-Location

White Carding

$$S_{\text{tot}} = \frac{2\pi\omega}{\hbar} \int d^3x \gamma(g_{\text{int}}(x,t)) (q^{\text{in}}(x,t) \int d^3y g_{\text{int}}(y,t))$$

$\int d^3y (x-y)^{-1}$
non-local Nuclei-Jonson-Lesslie

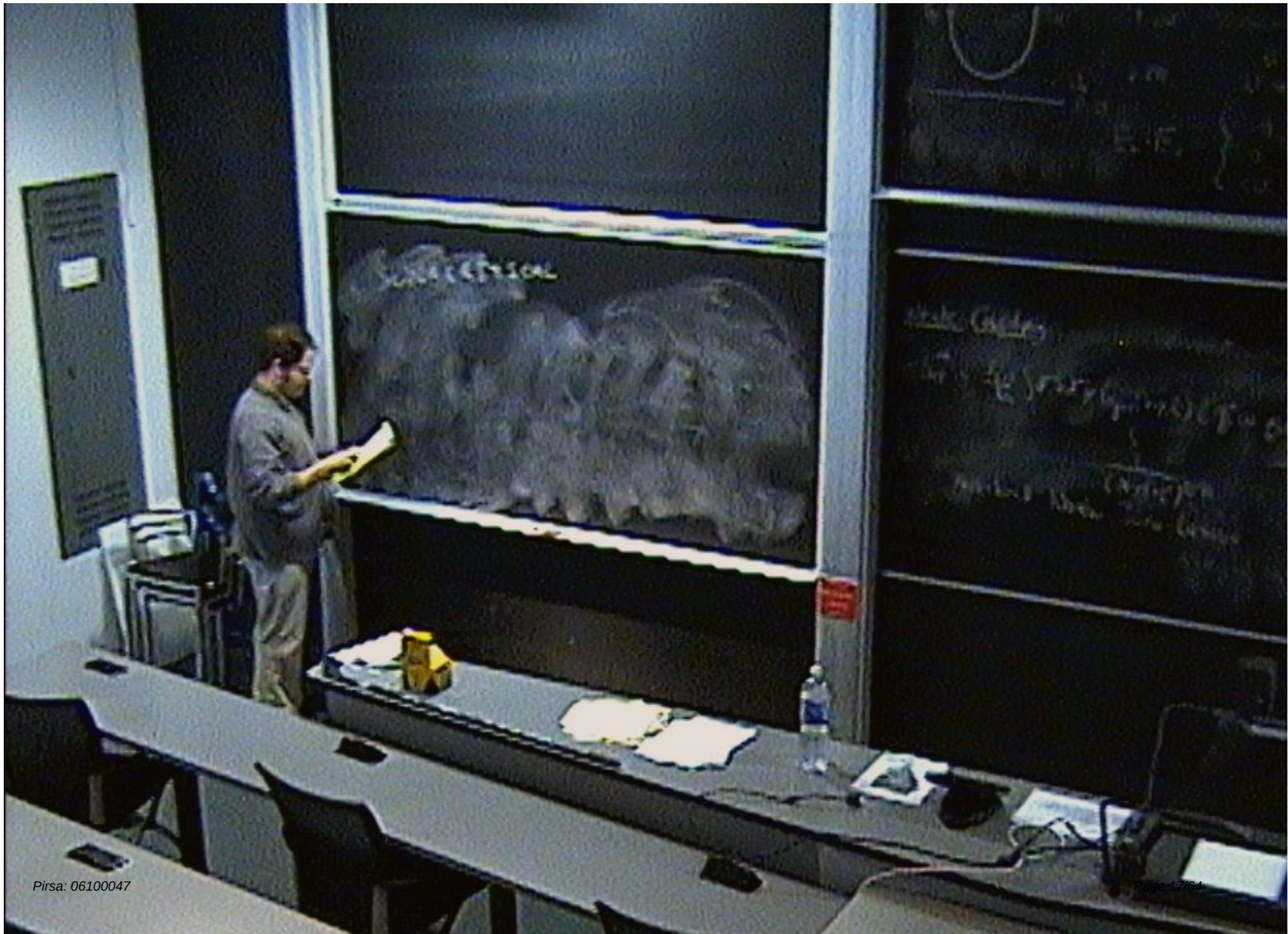


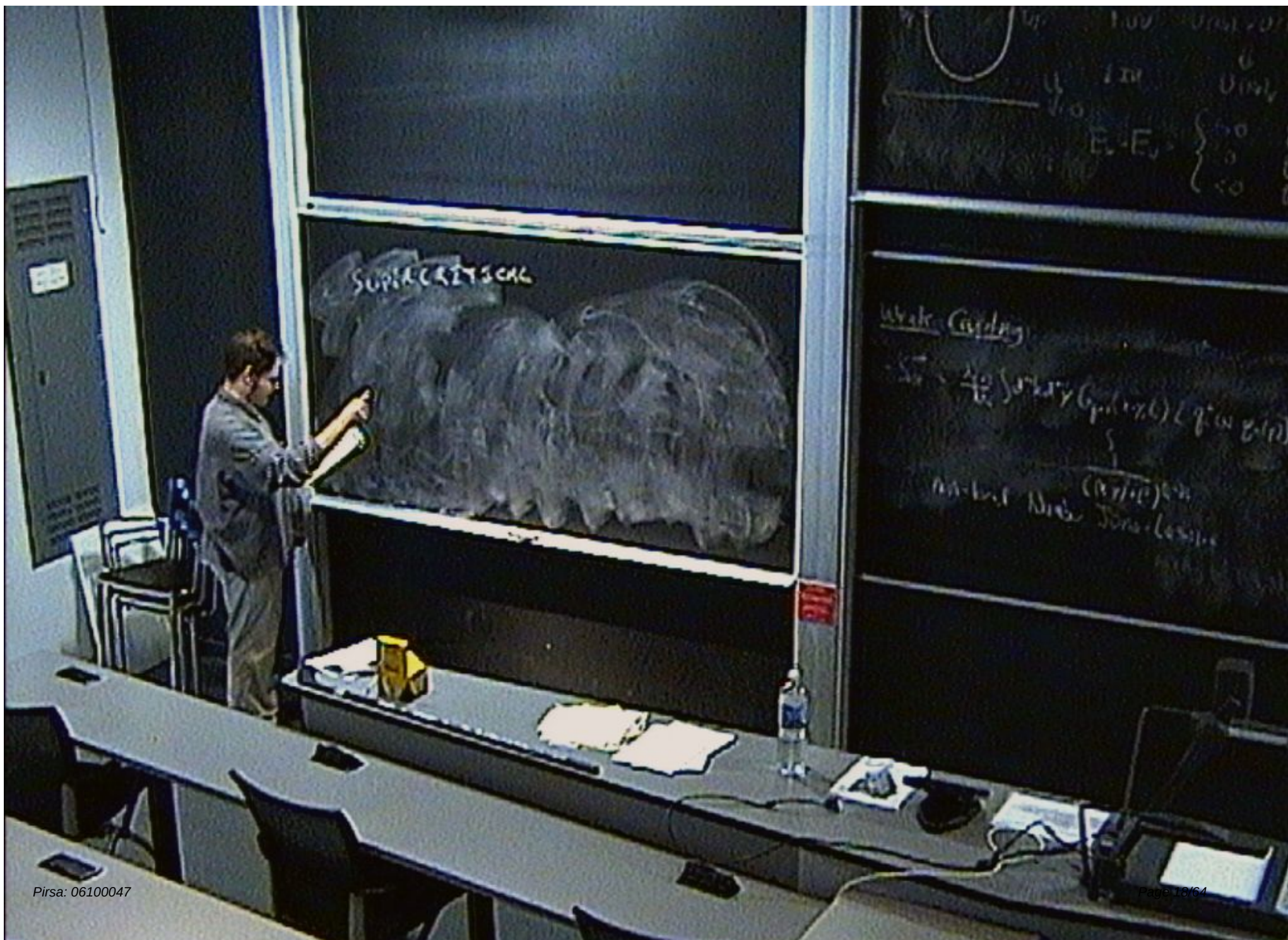
SUBCRITICAL

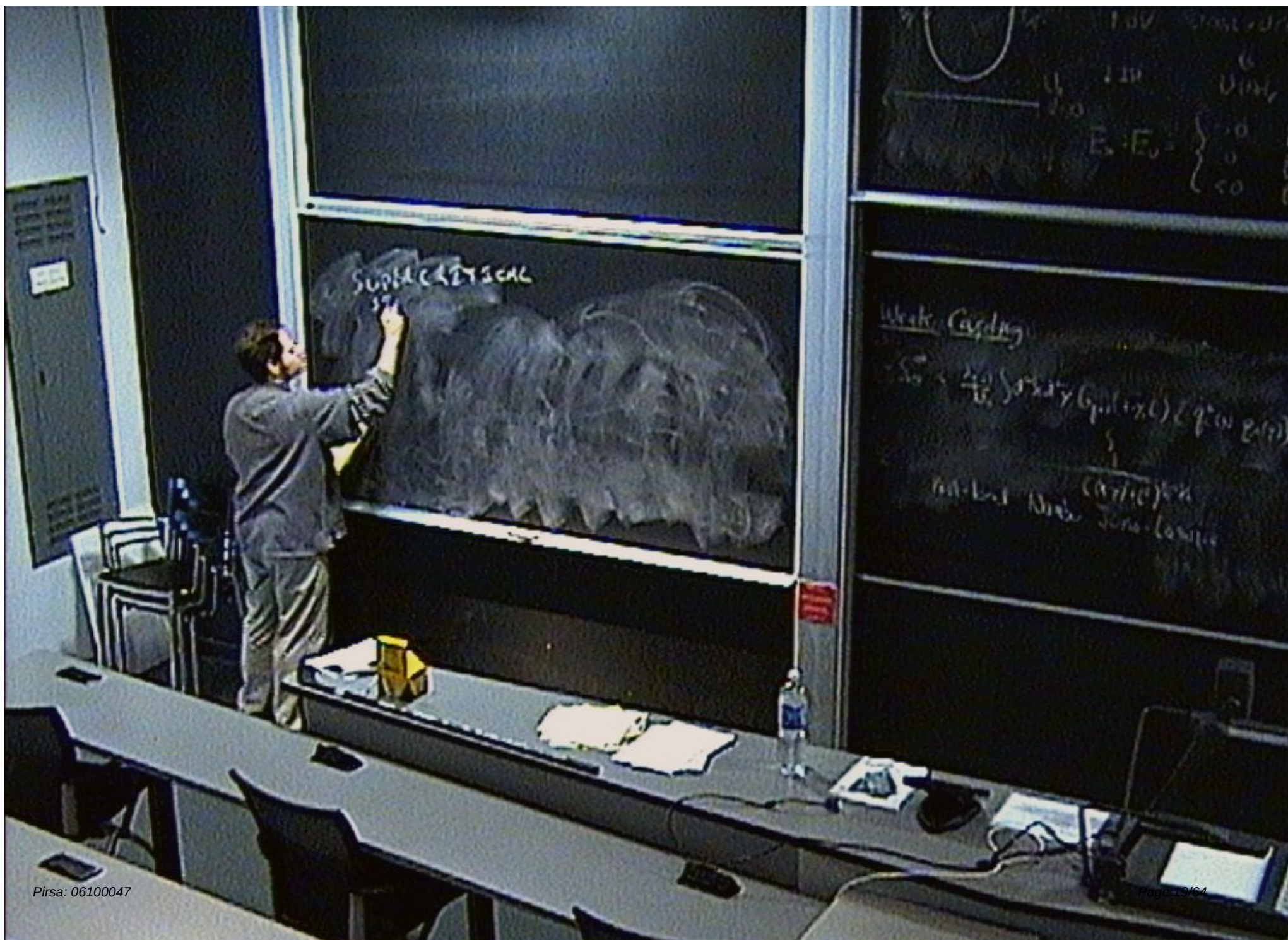
Wave Coupling

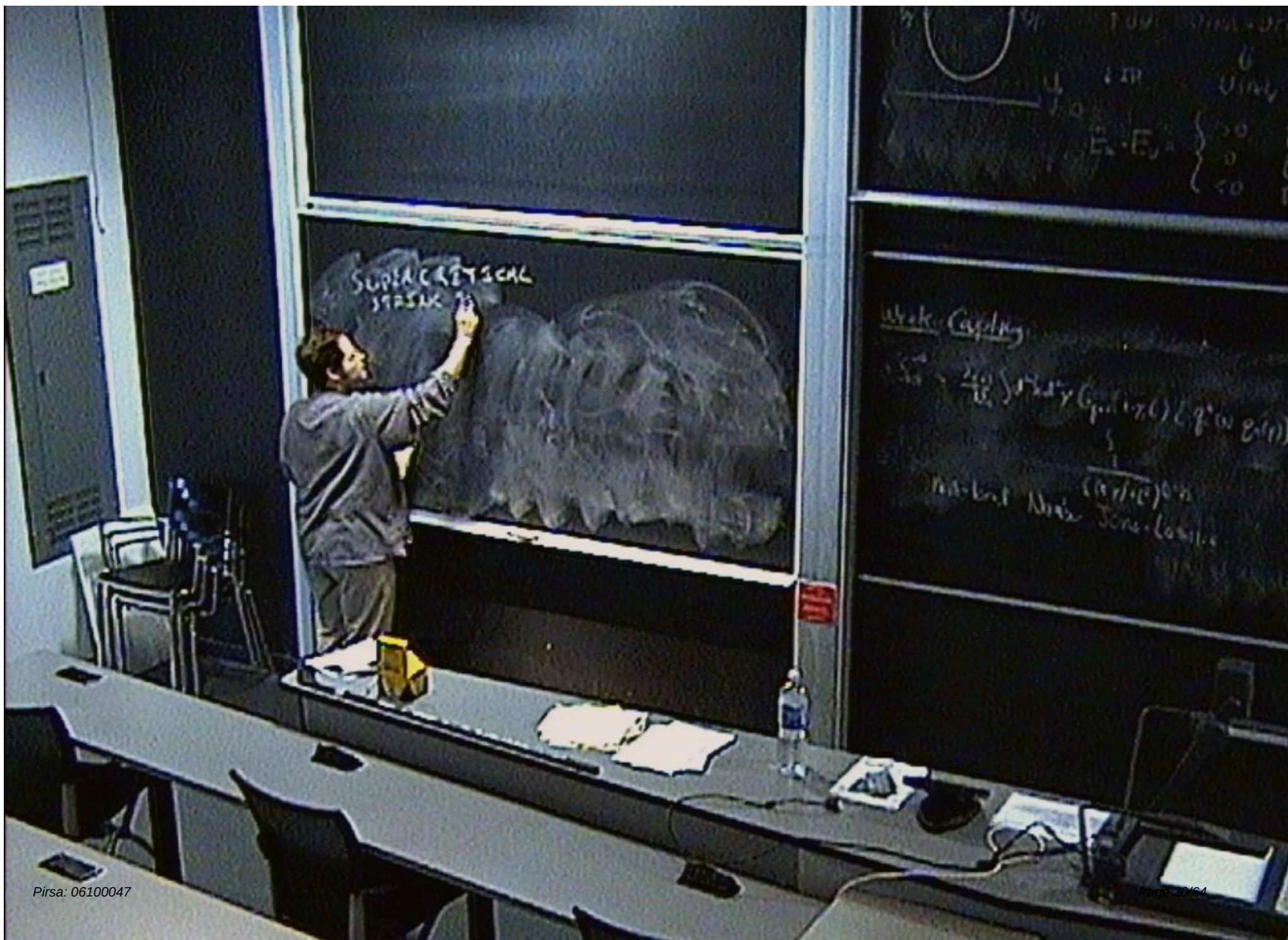
$$\vec{S} = \frac{1}{2} \text{Re} \{ \vec{E} \times \vec{H}^* \}$$

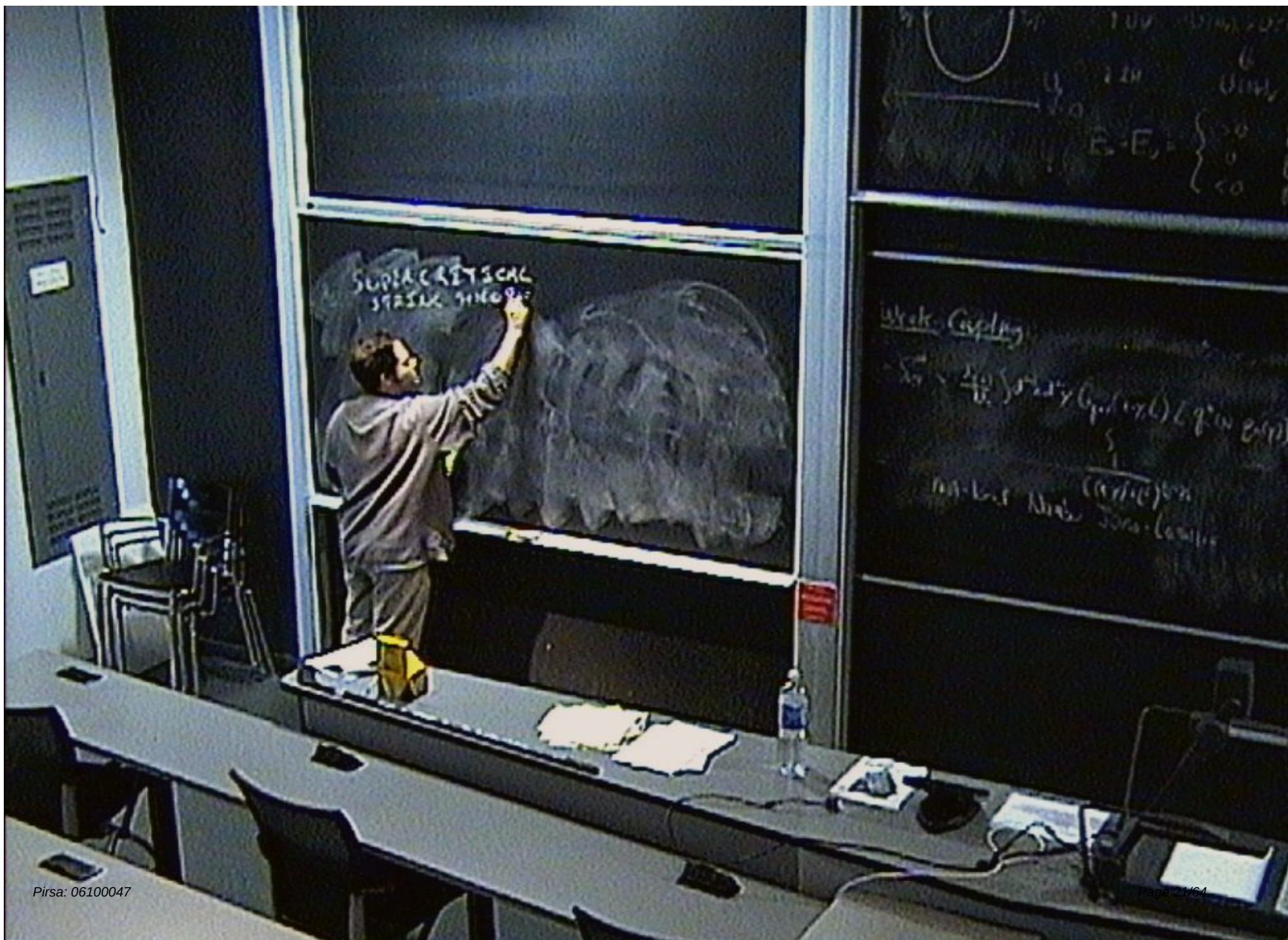
non-linear wave interaction

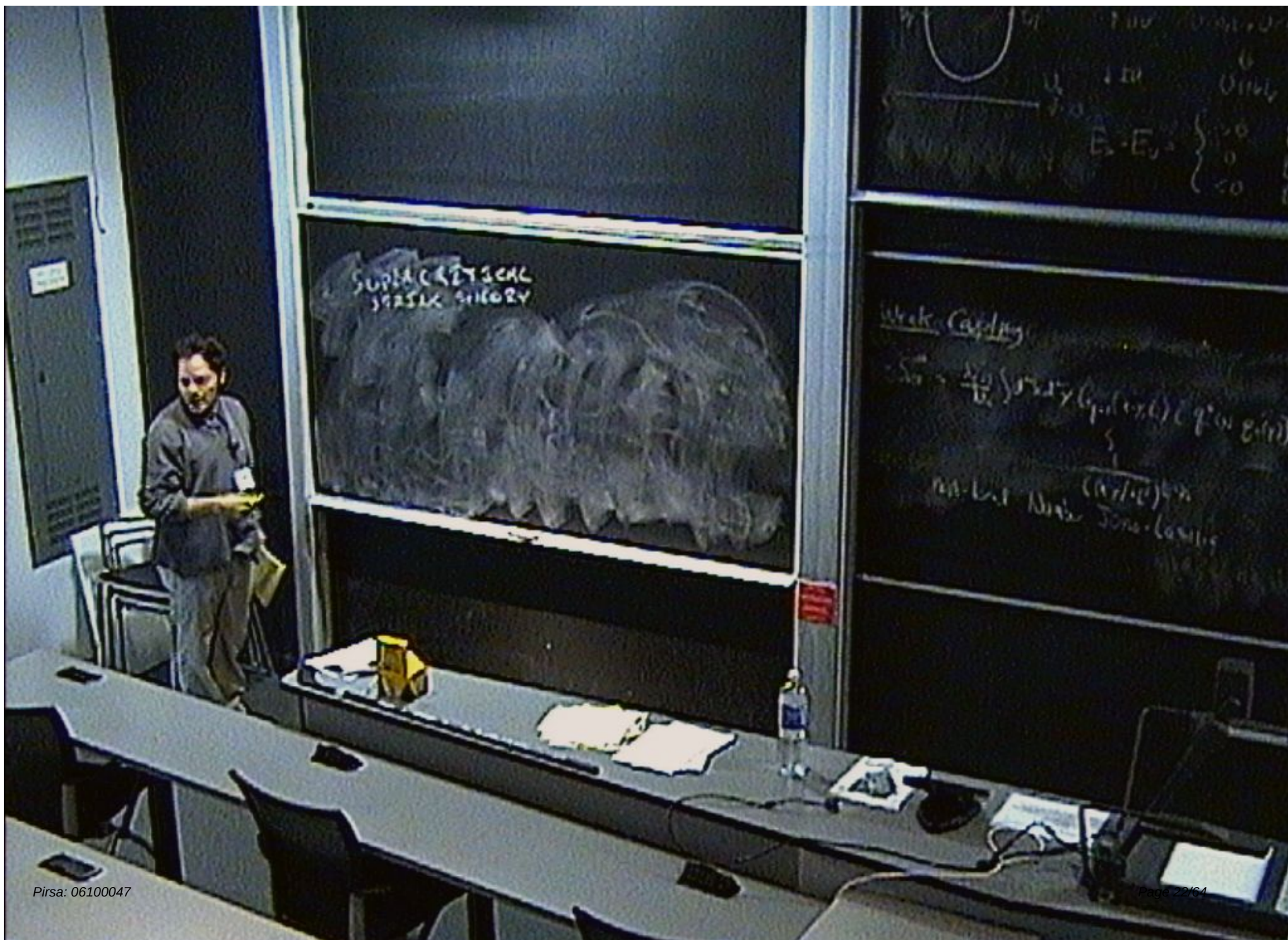












SUPERCritical STRING THEORY

D

SUPERCritical STRING THEORY

$$D > D_{\text{crit}} \quad \left. \begin{array}{l} 10 \text{ FOR SUPER} \\ 26 \text{ FOR BOSONIC} \end{array} \right\}$$

$$S_{\text{STRING}} = \int \sqrt{-g} \quad (-\epsilon)$$

$$\frac{D - D_{\text{crit}}}{4 - 6}$$

SUPERCritical STRING THEORY

$$D > D_{\text{crit}} \quad \left. \begin{array}{l} 10 \text{ FOR SUPER} \\ 26 \text{ FOR BOSONIC} \end{array} \right\}$$

$$S_{\text{STRING}} = \sqrt{G}^{\text{11c}} \left(- \epsilon(-2\alpha') \frac{D - D_{\text{crit}}}{\frac{4}{26} \cdot \alpha'} \right)$$

SUPERCritical STRING THEORY

$$D > D_{crit}$$

10 FOR SUPER
26 FOR BOSONIC

$$S_{string} = \sqrt{G}^{11c} \left(-e(-2\phi) \frac{D - D_{crit}}{\frac{4}{27} \cdot \alpha'} \right)$$

QUINTESSENCE

SUPERCritical STRING THEORY

$$D = D_{crit}$$

10 FOR SUPER
26 FOR BOSONIC

$$g_{\mu\nu} = \sqrt{-g} \left(-e^{(-2\phi)} \frac{D - D_{crit}}{\frac{4}{6} \cdot \alpha'} \right)$$

ESSENCE
FRW COS

$$ds^2 = -dt^2 + a^2 dx_i dx_i$$

SUPERCritical STRING THEORY

$$D > D_{crit} \left. \begin{array}{l} 10 \text{ FOR SUPER} \\ 26 \text{ FOR BOSONIC} \end{array} \right\}$$

$$S_{string} = \int G^{11c} \left(-e(-2\phi) \frac{D - D_{crit}}{\frac{4}{3} \cdot \alpha'} \right)$$

QUINTESSENCE
FRW COS
 $-1 < w < \dots$

$$ds^2 = -dt^2 + a^2 dx_i dx_i$$

SUPERCritical STRING THEORY

$$D > D_{crit}$$

10 FOR SUPER
26 FOR SUPER

$$S_{string} = \int G^{11} \left(-e(-2\Phi) \frac{D - D_{crit}}{\frac{4}{27} \alpha'} \right)$$

QUINTESSENCE
FRW cos

$$-1 < w < -\frac{1}{3}$$

$$ds^2 = -dt^2 + a^2 dx_i dx_i$$

$$V = \cos(\chi \phi)$$

$$V = \cos(\chi\phi)$$

$$\frac{a}{a} = D - 1$$

$$V = c \phi(X \phi)$$

$$\frac{a}{a} = - \frac{D-3 + n(n-1)}{(n-1)(n-2)} \int$$

$$V = c \exp(\chi \phi)$$

$$\frac{\dot{a}}{a} = - \frac{D-3 + n(n-1)}{(n-1)(n-2)} \mathcal{S}$$

$$H^2 = \frac{2}{(n-1)(n-2)} \mathcal{S}$$

$$S_4 = \frac{1}{\kappa^2} \left[\frac{1}{2} (\dot{\phi})^2 - V(\phi) \right] \quad \mathcal{S} = \frac{1}{\kappa^2} \left(\frac{1}{2} \dot{\phi}^2 + V \right)$$

$$\gamma^2 = \frac{2(n-1)(w+1)}{n-2}$$

$$w = -1 + \frac{(n-1)\gamma^2}{2(n-1)}$$

$$\beta = \beta_0(1/\lambda_1)$$

$$a = a_0 \left(\frac{1}{\lambda_1} \right)^\alpha$$

$$\alpha = \frac{2n}{(1+w)(n-1)}$$

$$S = S_0 \left(\frac{a_0}{a} \right)^{(1+w)(n-1)}$$

$$\gamma^2 = \frac{2(n-1)(w+1)}{n-2}$$

$$w = -1 + \frac{(n-2)\gamma^2}{2(n-1)}$$

$$\beta = \beta_0 (1/t_0)$$

$$a = a_0 \left(\frac{1}{t_0} \right)^\alpha$$

$$\alpha = \frac{2}{(1+w)(n-1)}$$

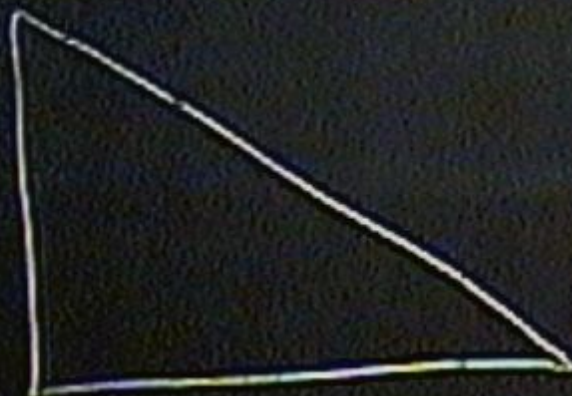
$$S = S_0 \left(\frac{a_0}{a} \right)^{(1+w)(n-1)}$$

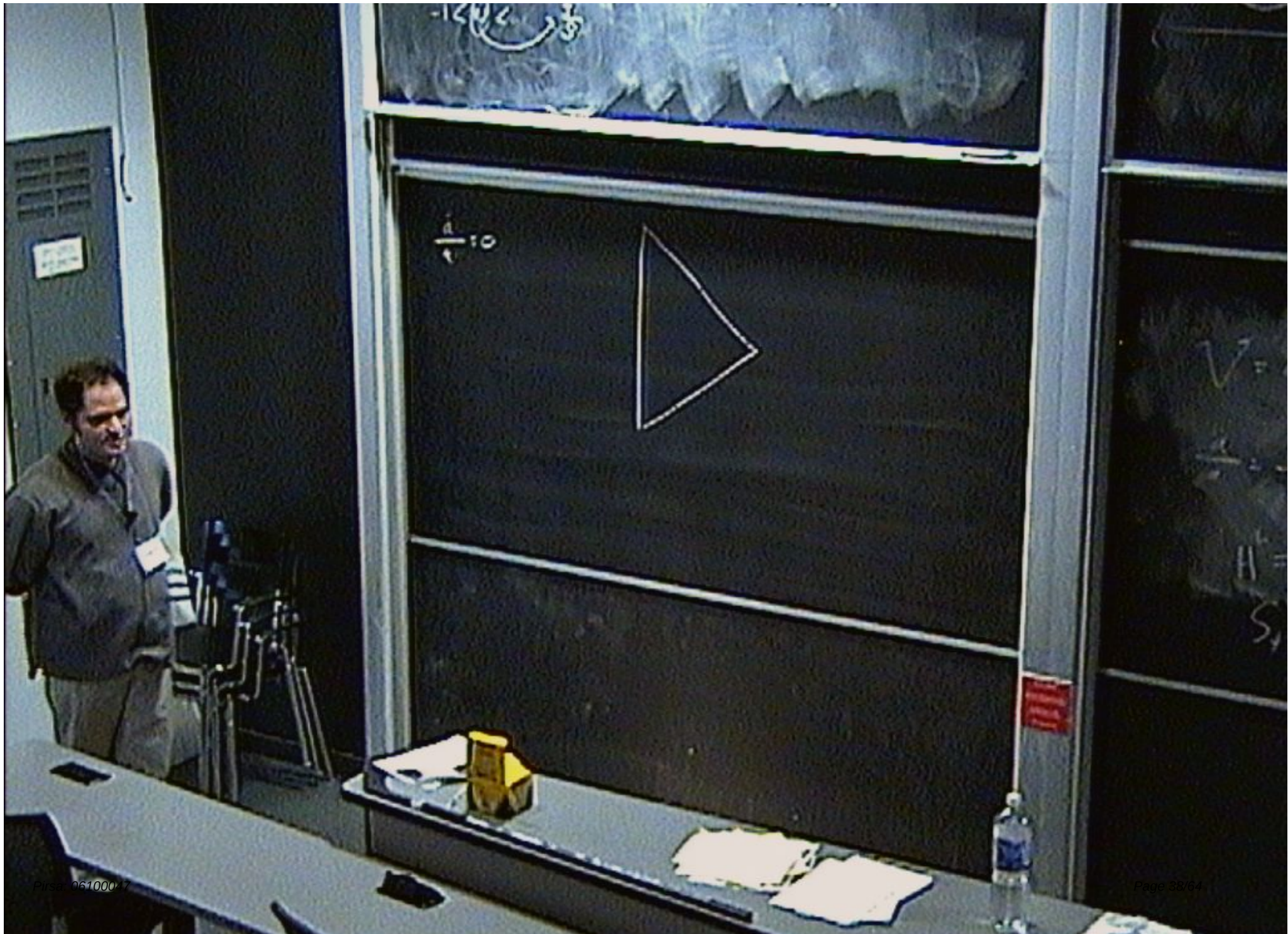


$$\frac{\partial a}{\partial t} \rightarrow 0$$



$$\frac{a}{a} = 10$$

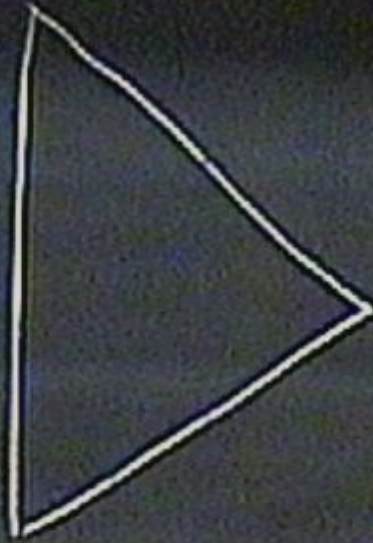




$$\frac{d}{t} = 10$$



$$\frac{\ddot{a}}{a} = 0$$



$$w_{\text{cast}} = -\frac{D-3}{D-1}$$

$$c = \frac{D-26}{3\alpha'}$$

$$\frac{2}{\sqrt{D-2}}$$

$$\leadsto w = w_{\text{cast}}$$

$$\frac{\dot{a}}{a} = 0$$



$$t_{\text{row}} = -\frac{\sqrt{D-2}}{b} \ln(t_{\text{row}}/H_0)$$

$$b = -\sqrt{\frac{2(D-2G)}{3H_0(D-2)}}$$

WEYL
RESALE
 $G_{\dots} = \{ \dots$
 $\bar{\phi} = -b t_{\text{row}}$

STABILITY
FLUC'S

CANONICAL
MASSLESS
(RESALED)

HAVE
TACH.
MASS

$$m^2 \propto - \frac{(\bar{\rho} - \rho_c)}{6\alpha^2} \neq 0$$

$$\sigma_{\text{CANONICAL}} d e(+\sqrt{m^2} t)$$

DILATON
FACTOR
WINDS
(TIES)

INT FRACTURE
MODE

$$e(+\sqrt{m^2 - \Gamma} t)$$

$$\Gamma \geq \sqrt{m^2}$$

FUTURE

PHYSICALLY
IMPOSSIBLE

T

$$e(-\underline{v}) (\underline{v}T)^2 + m^2 T^2$$

FUTURE

PHYSICALLY
IMPOSSIBLE

$$e(-2\bar{t}) ((\bar{v}T)^2 + m^2 T^2)$$

$T e(+\bar{t})$ grows with time

FUTURE

$$e(-2\bar{t}) ((\bar{v}T)^2 + m^2 T^2)$$

PHYSICALLY
IRRELEVANT

$T e(\bar{v})$ grows with time

DESTROY STATE

REDUCE #dim's dynamically
other

HET
56.9
in
D=10

$$T = A(\beta x^u) \cdot X,$$

HET
SLG
n
D=10

$$T = e(\beta x^0) X,$$

$$\rightarrow V_{ws} = e(2\beta x^0) X,$$

HET
5.4.7
D=10

$$T = e(\beta x^0) X_1$$

$$\rightarrow V_{ws} = e(2\beta x^0) X_1^2$$

$x^0 \rightarrow \infty$
RESTRICTED TO $x_1 = 0$

$$\gamma^2 = \frac{2(n-1)(w+1)}{n-2}$$

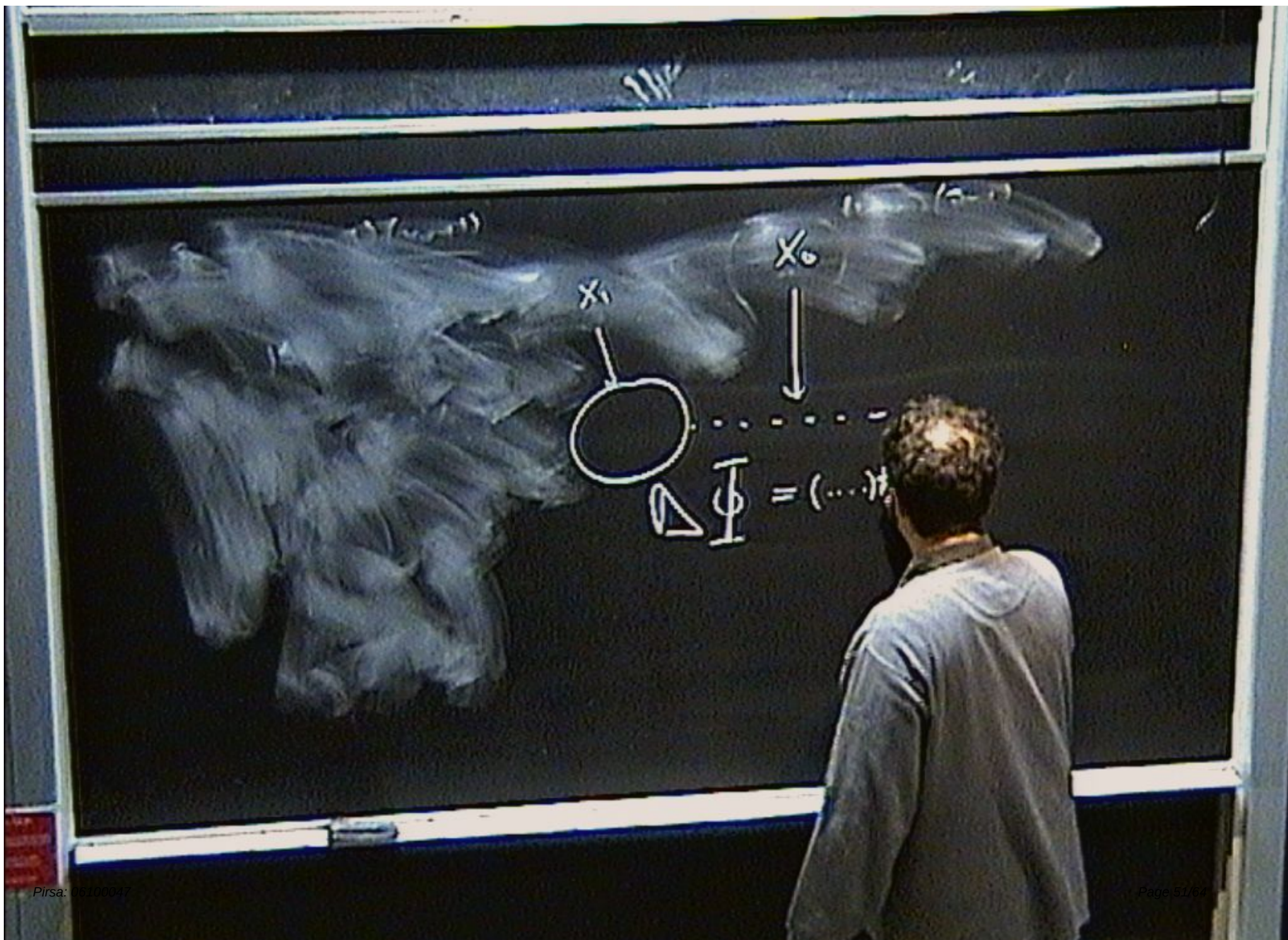
$$w = -1 + \frac{(n-2)\gamma^2}{2(n-1)}$$

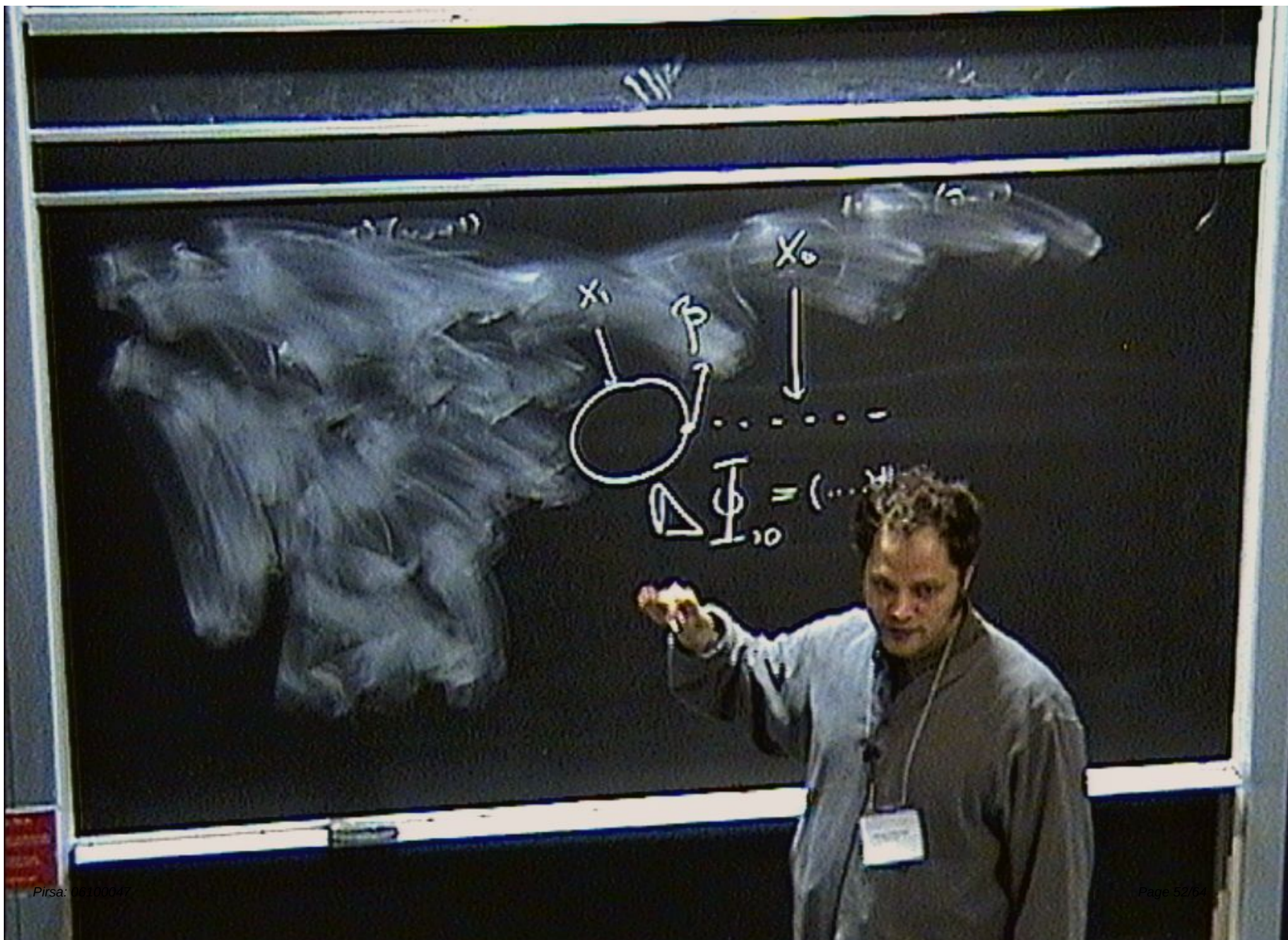
$$\beta = \beta_0 \ln(1/l_0)$$

$$a = a_0 \left(\frac{1}{l_0} \right)^\alpha$$

$$\alpha = \frac{2}{(1+w)(n-1)}$$

$$S = S_0 \left(\frac{a_0}{a} \right)^{(1+w)(n-1)}$$





$\mathbb{P}^3$



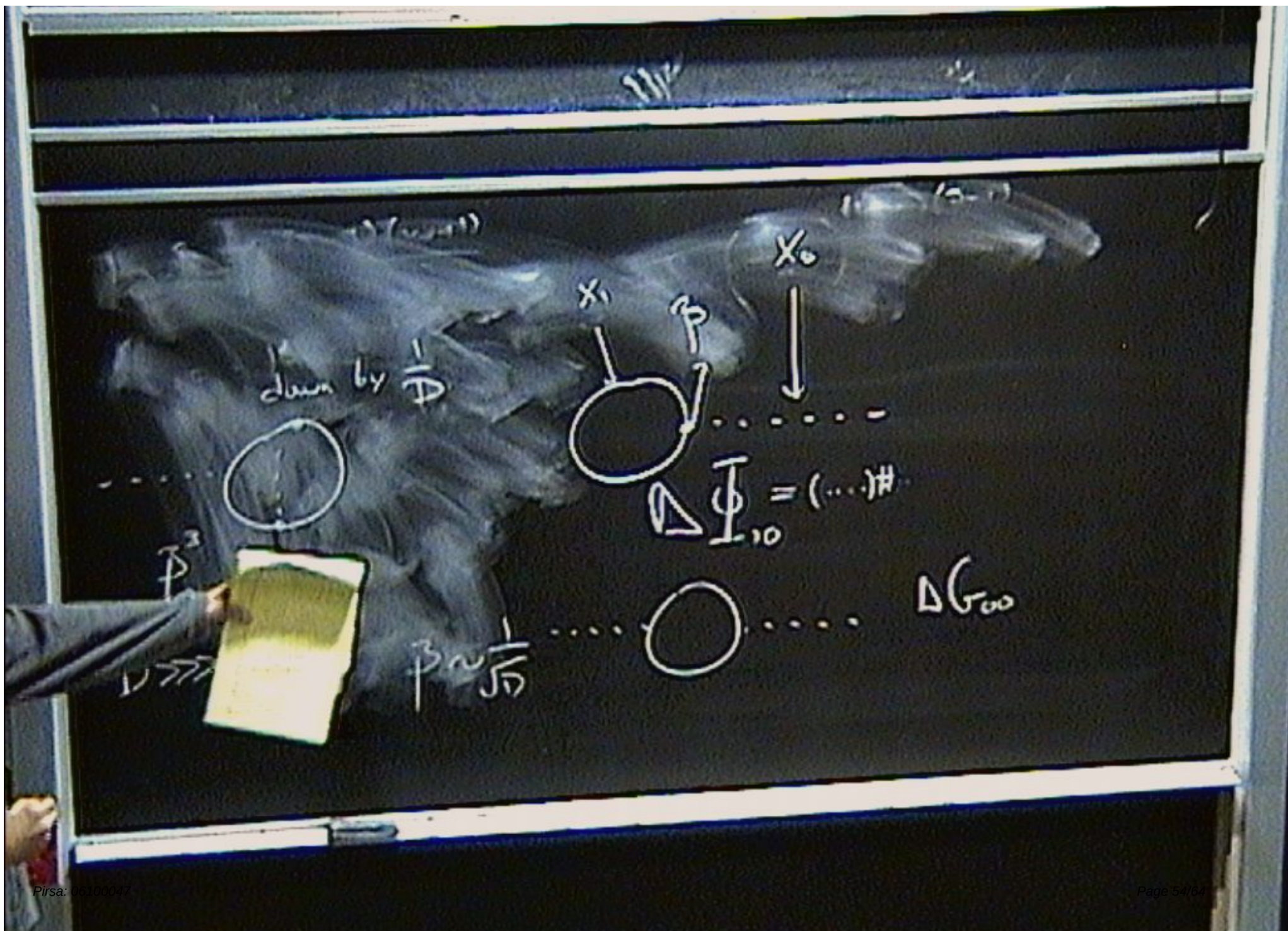
x_0



$$\Delta \bar{\Gamma}_{10} = (\dots)^\#$$



ΔG_{00}



$$\Delta(G_{\text{ind}} (\nabla \Phi)^2)$$

COMPENSATES
LOSS
TO LEADING
O. IN $\frac{1}{D}$

$$T = \mu \exp(\beta x^+)$$

$$T = \mu \exp(\beta x^+) \\ - (\beta x^+) \sqrt{\beta x^-}$$

$$T = \mu \exp(\beta x^+)$$

$$-(\beta x^+) / (\beta x^-) \pm \dots =$$

$$T = \mu \exp(\beta x^+) x_2$$

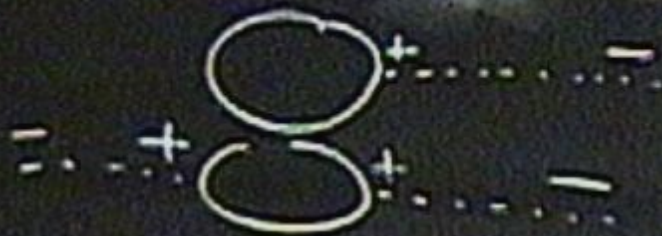
$$-(\beta x^+) (\partial x^-) \pm \dots =$$

$$V_{ws} = \mu^2 x_2^2 e(2\beta x^+)$$

$$T = \mu \exp(\beta x^+) x_2$$

$$-(\beta x^+) (\beta x^-)$$

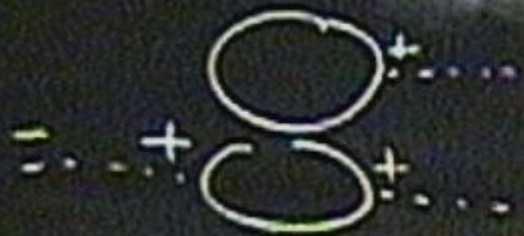
$$V_{ws} = \mu^2 x_2^2 e(2\beta x^+)$$



$$T = \mu \exp(\beta x^+) x_2$$

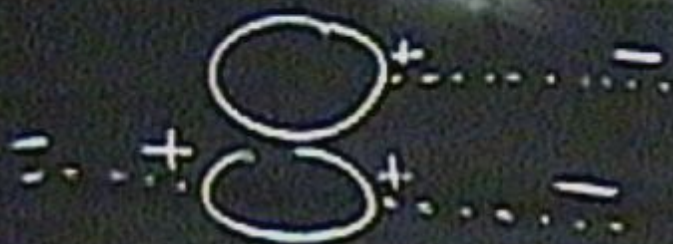
$$-(\vec{\beta} x^+) (\vec{\beta} x^-) + \dots =$$

$$V_{ws} = \mu^2 x_2^2 e(2\beta x^+)$$



$\Delta(G_{\mu\nu}(\vec{y}, \vec{\Phi})(\vec{z}, \vec{\Phi}))$
CHANCES TO
COMPENSATE

$$V_{ws} = \lambda^2 \chi^2 e(2\beta x +)$$



$\Delta(G_{\text{int}}(\Phi, \bar{\Phi})(\Phi, \bar{\Phi}))$
 CHANCES TO
 COMPENSATE
 LOSS OF DIM'N

WINS
 (TIES)

$$e(+|m-1|+)$$

$$\Gamma \geq \sqrt{m}$$

RETURN TO 1/4 BPS

RETURN TO 'K BPS
SOLVABLE IN SPHERE