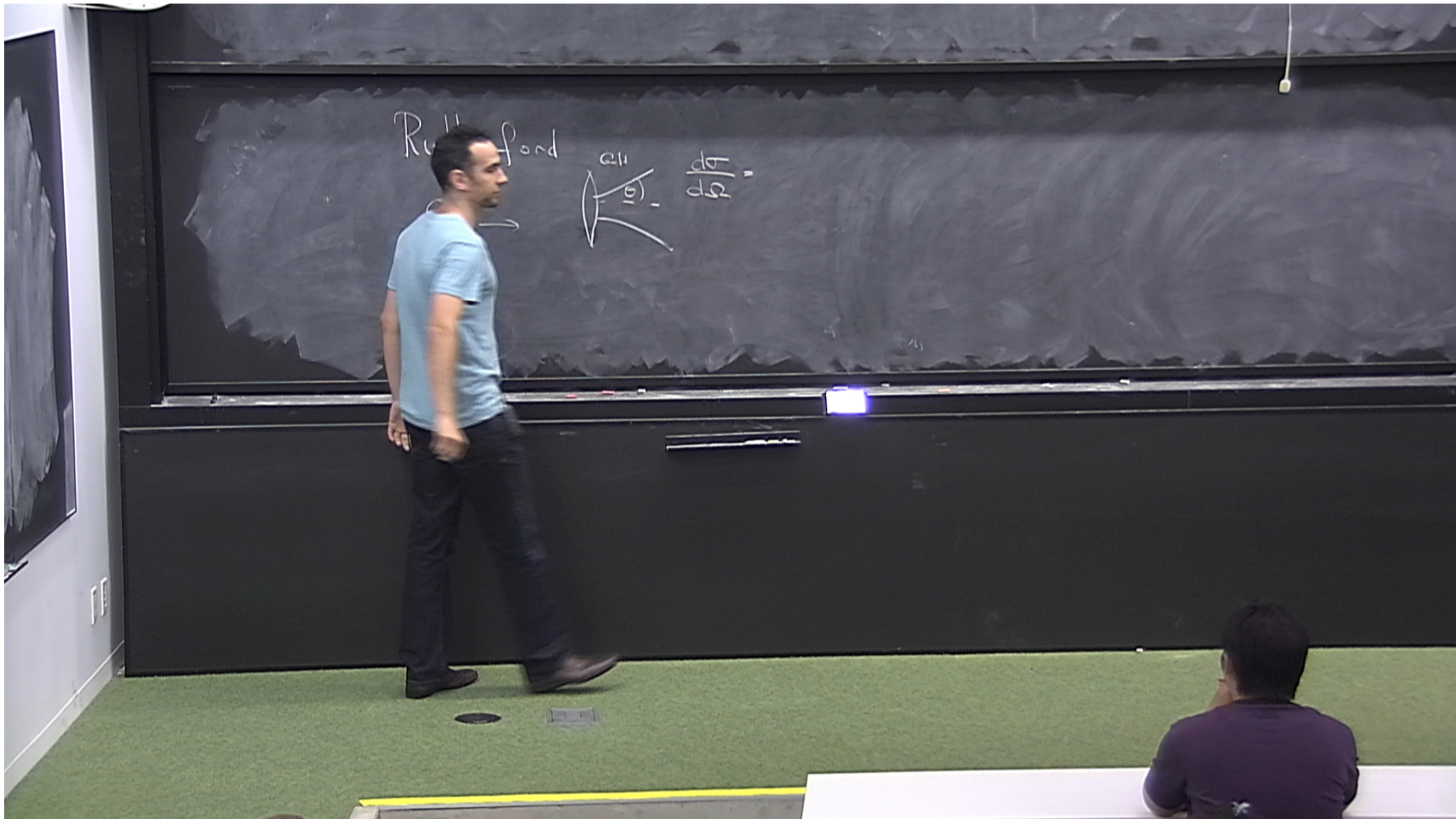


Title: Visiting Researcher Presentation: Itay Yavin

Date: Aug 26, 2011 02:30 PM

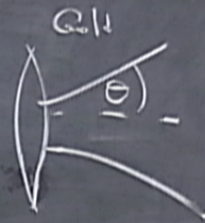
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Abstract:



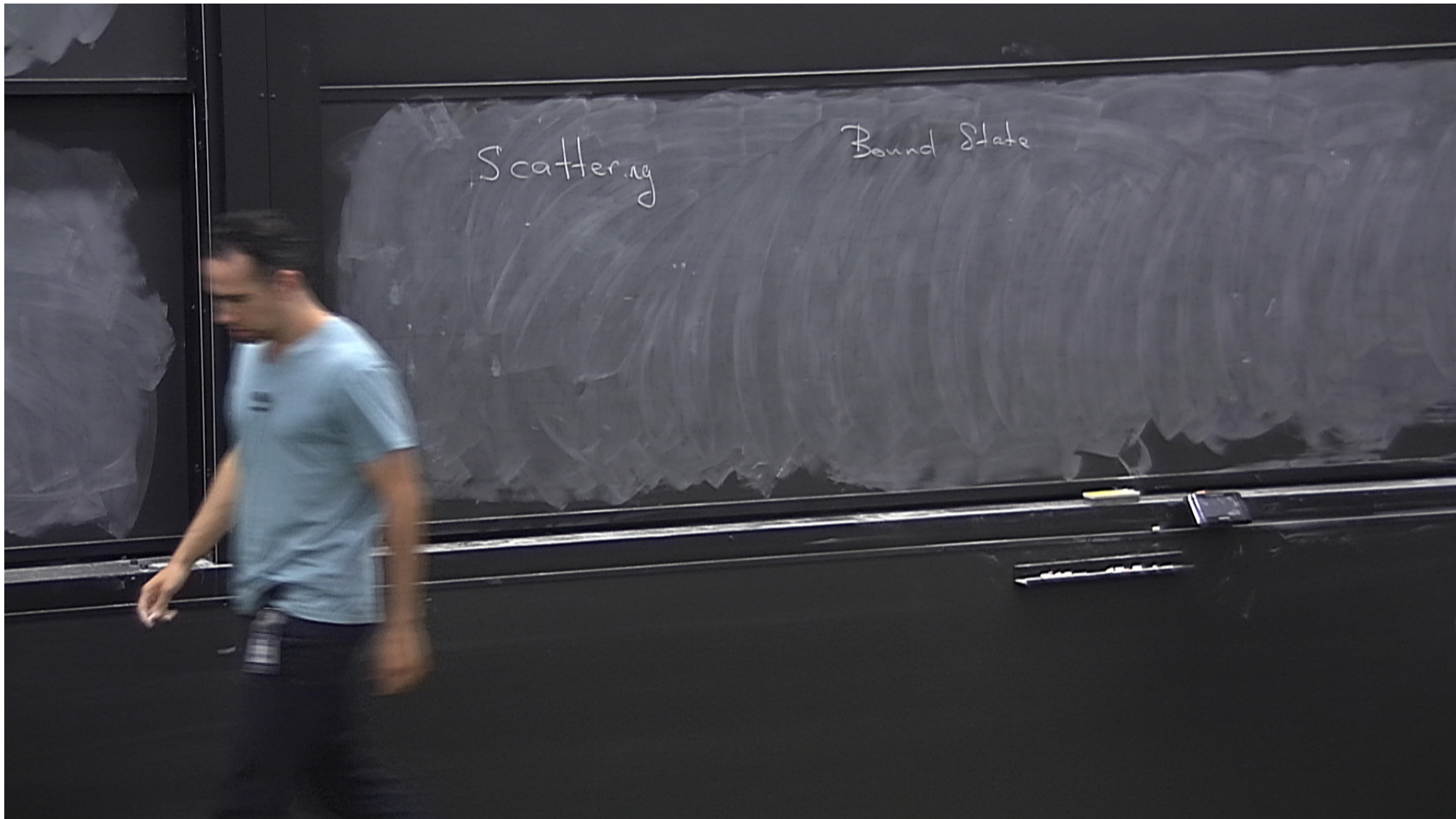
Rutherford

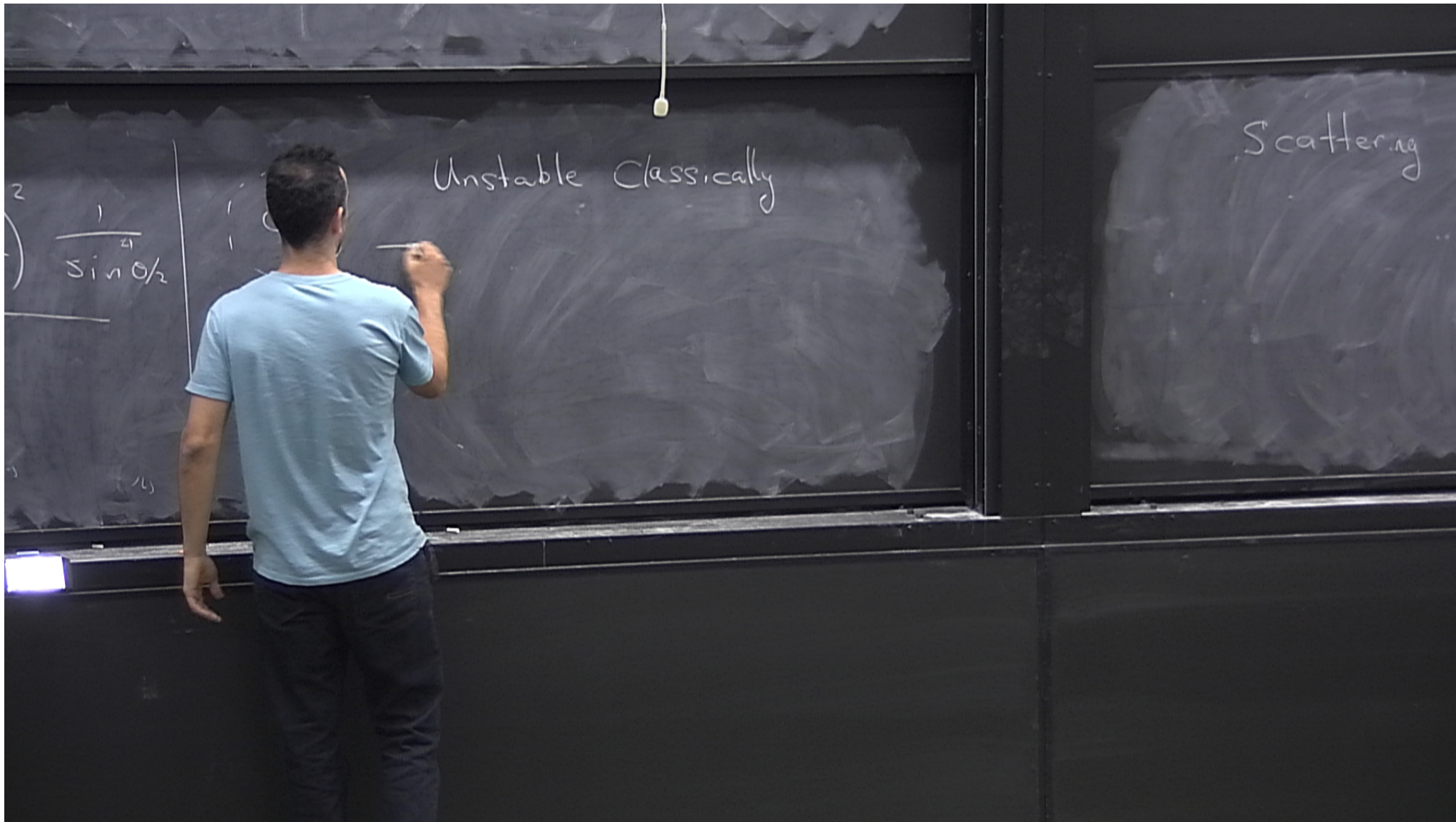
α He $\rightarrow$



$$\frac{d\sigma}{d\Omega} = \left(\frac{Z_1 Z_2 e^2}{4 m v^2} \right)^2 \frac{1}{\sin^4 \theta/2}$$





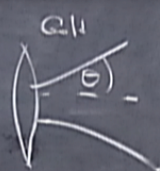


$z = e \quad ds$

of α and α

Rutherford

$\alpha \text{ He} \rightarrow$



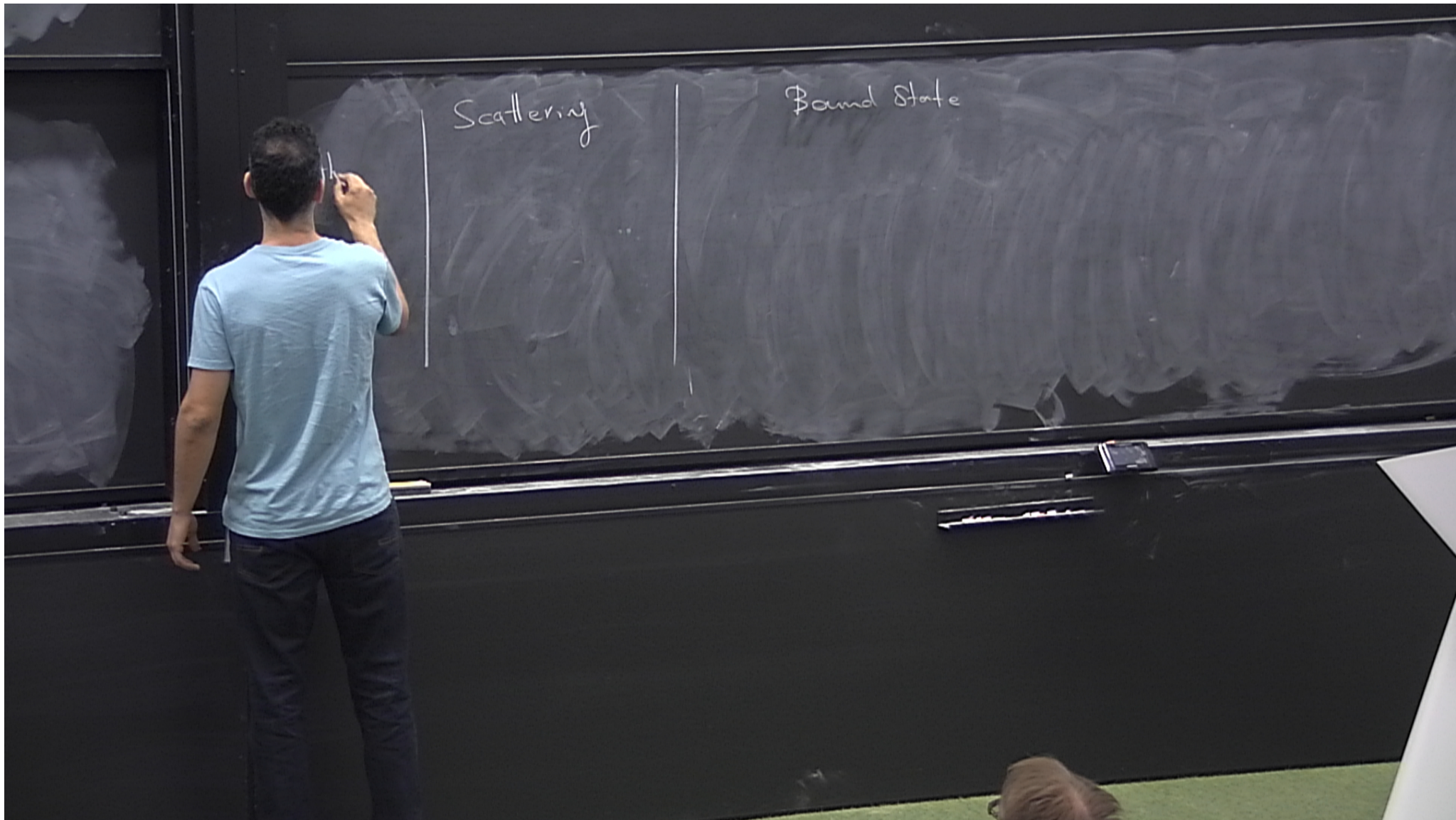
$$\frac{d\sigma}{d\Omega} = \left(\frac{\alpha}{mv^2} \right)^2 \frac{1}{\sin^4 \theta/2}$$

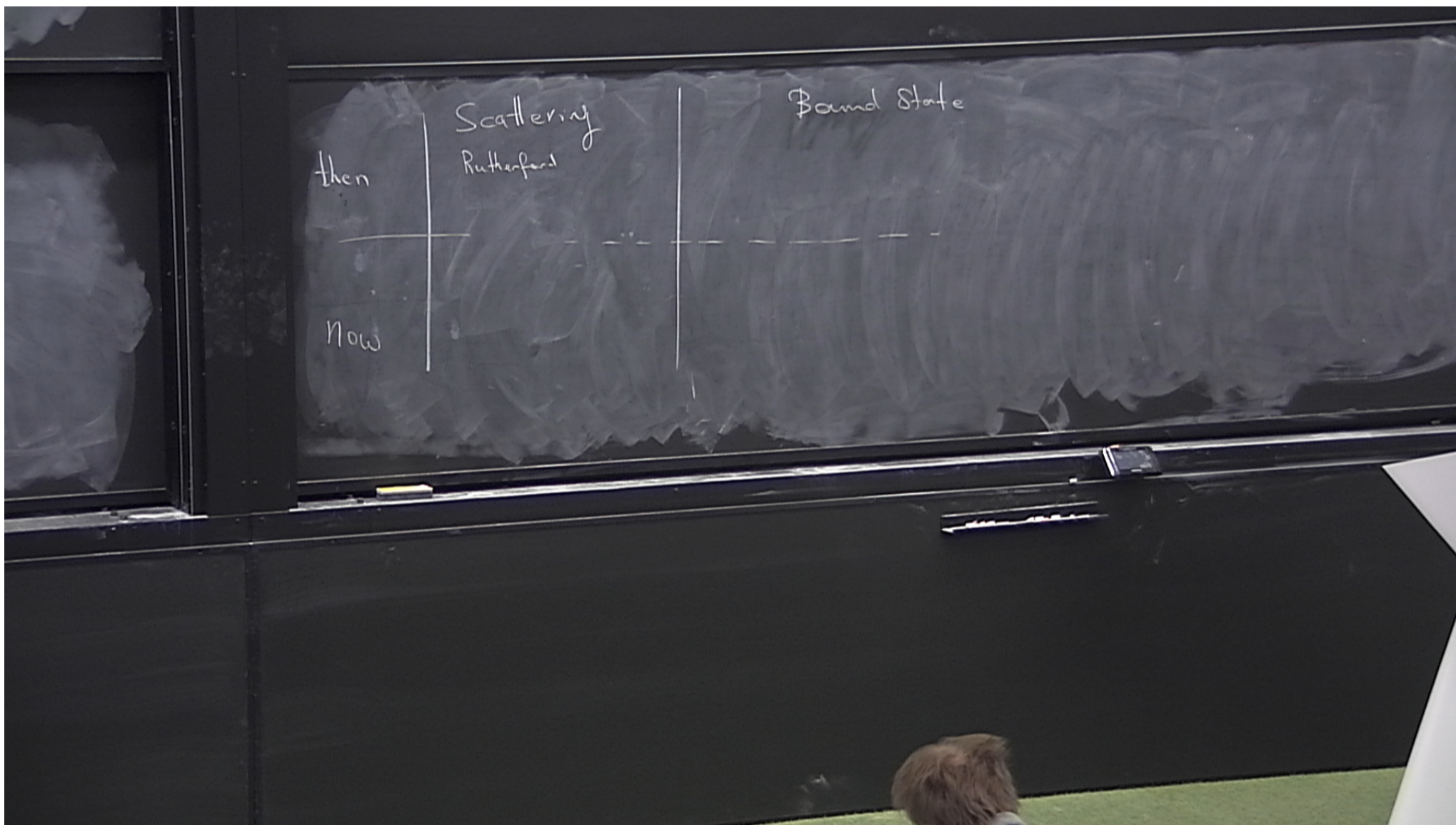


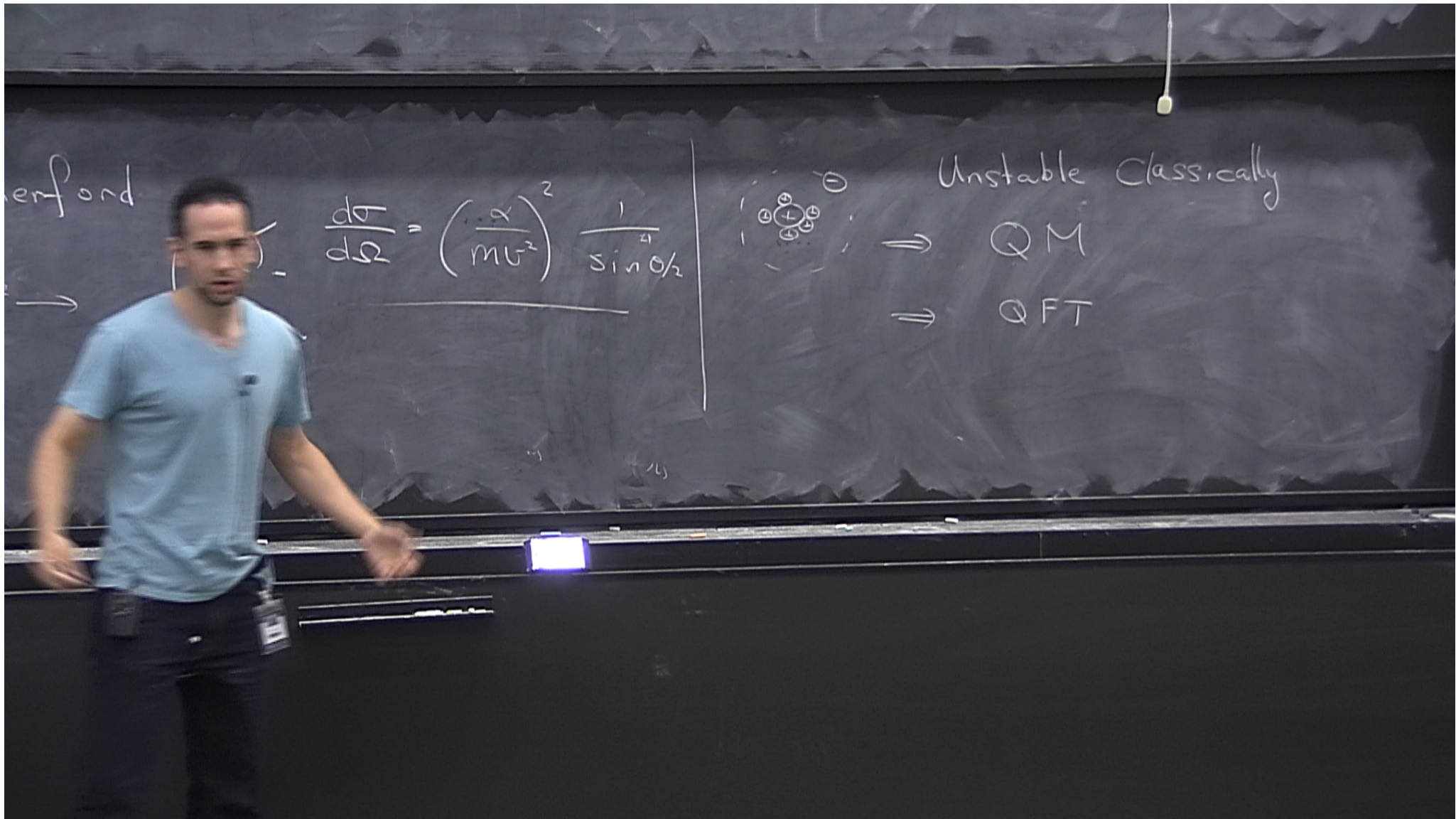
Unstable Classically

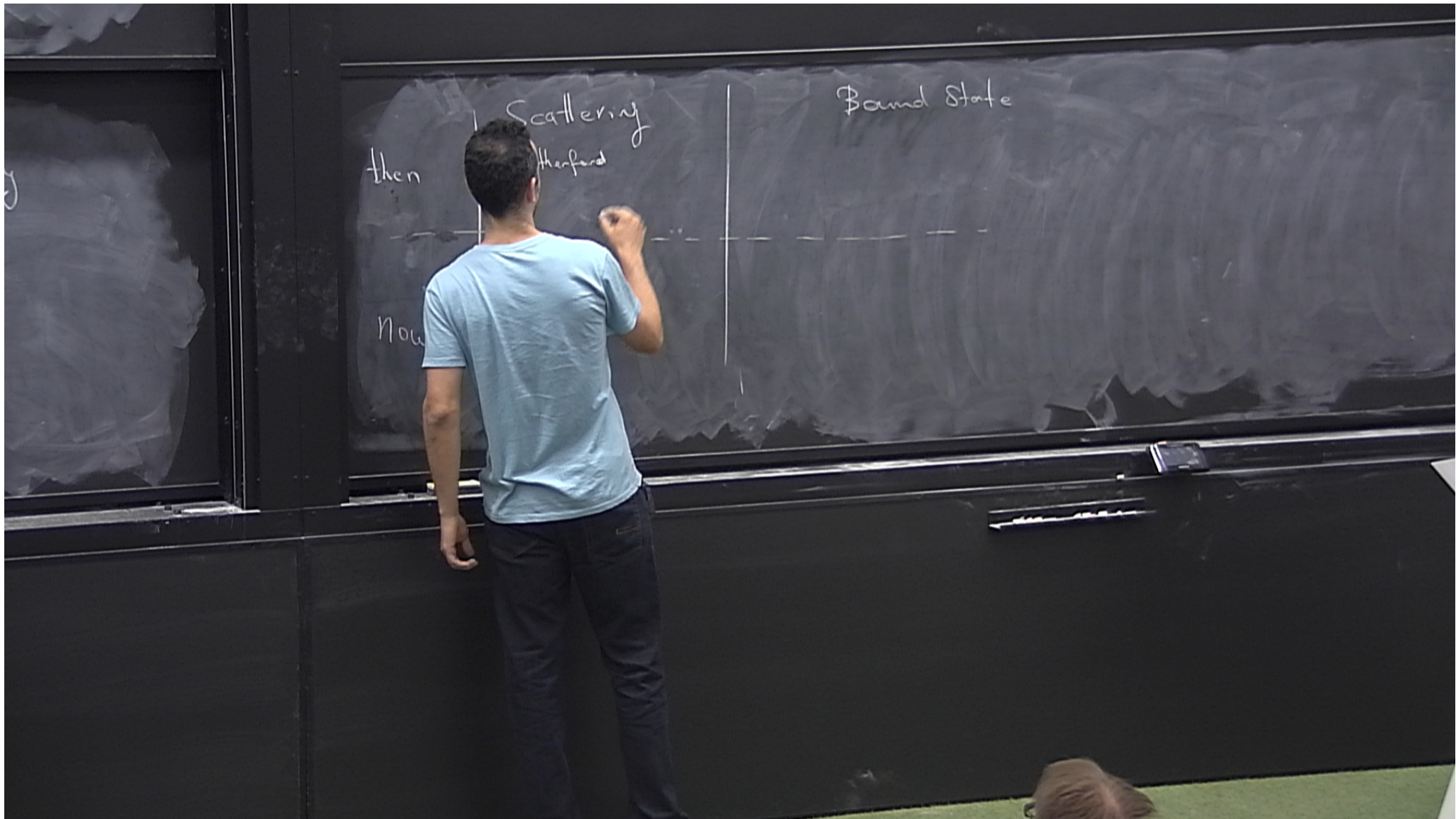
$\Rightarrow$ QM

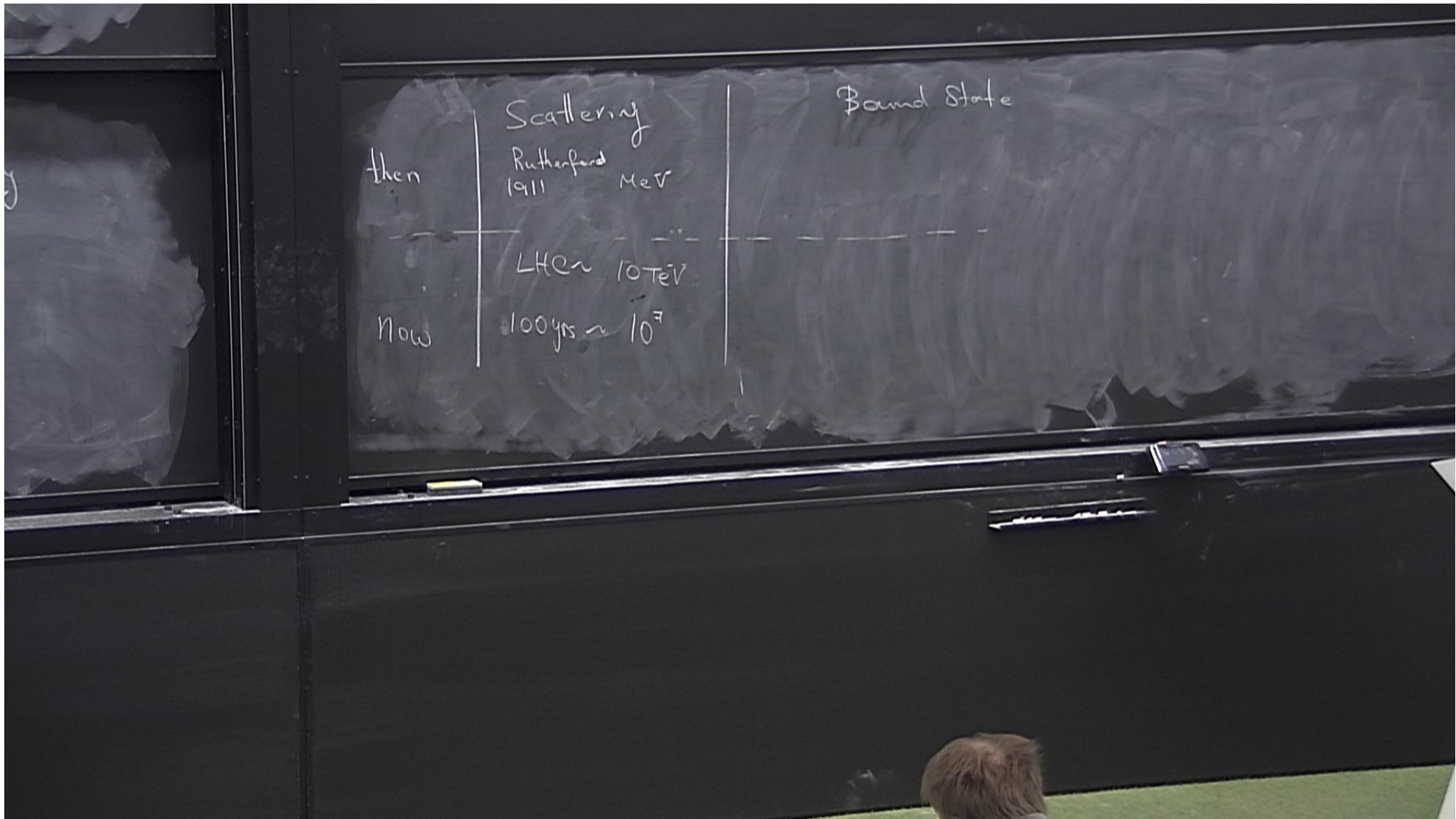
$\Rightarrow$ QFT









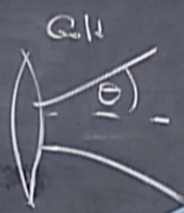


	Scattering	Bound State	Strong Int
then	Rutherford 1911 MeV		
	↓		
	LHC ~ 10 TeV		
Now	100 yrs ~ 10^7		

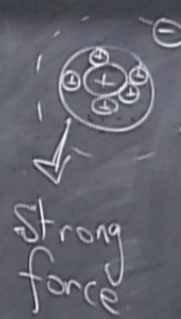


Rutherford

α He $\rightarrow$



$$d\sigma = \left(\frac{Z}{mv^2} \right)^2 \frac{1}{\sin^4 \theta/2}$$



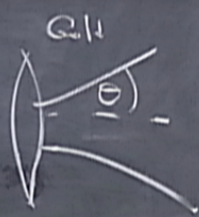
Unstable Classically

$\Rightarrow$ QM

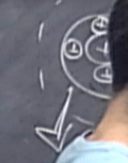
$\Rightarrow$ QFT

Rutherford

α He $\rightarrow$



$$\frac{d\sigma}{d\Omega} = \left(\frac{Z}{mv^2} \right)^2 \frac{1}{\sin^4 \theta/2}$$



Unstable Classically

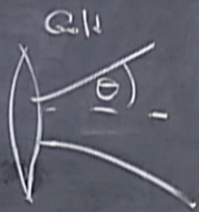
$\Rightarrow$ QM

$\Rightarrow$ QFT

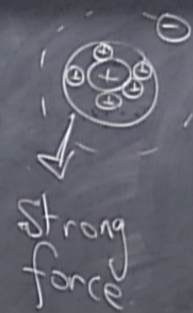
(QED)

Rutherford

α He $\rightarrow$



$$\frac{d\sigma}{d\Omega} = \left(\frac{Z_1 Z_2 e^2}{4 m v^2 \sin^2 \theta/2} \right)^2$$



Unstable Classically

$\Rightarrow$ QM

$\Rightarrow$ QFT

(QED) $\propto 1/137$

Scattering

Rutherford
1911 MeV

↓
LHC ~ 10 TeV

100 yrs ~ 10^7

Bound State

Strong Int
 $\alpha \sim 4$

Scattering

Rutherford
1911 MeV

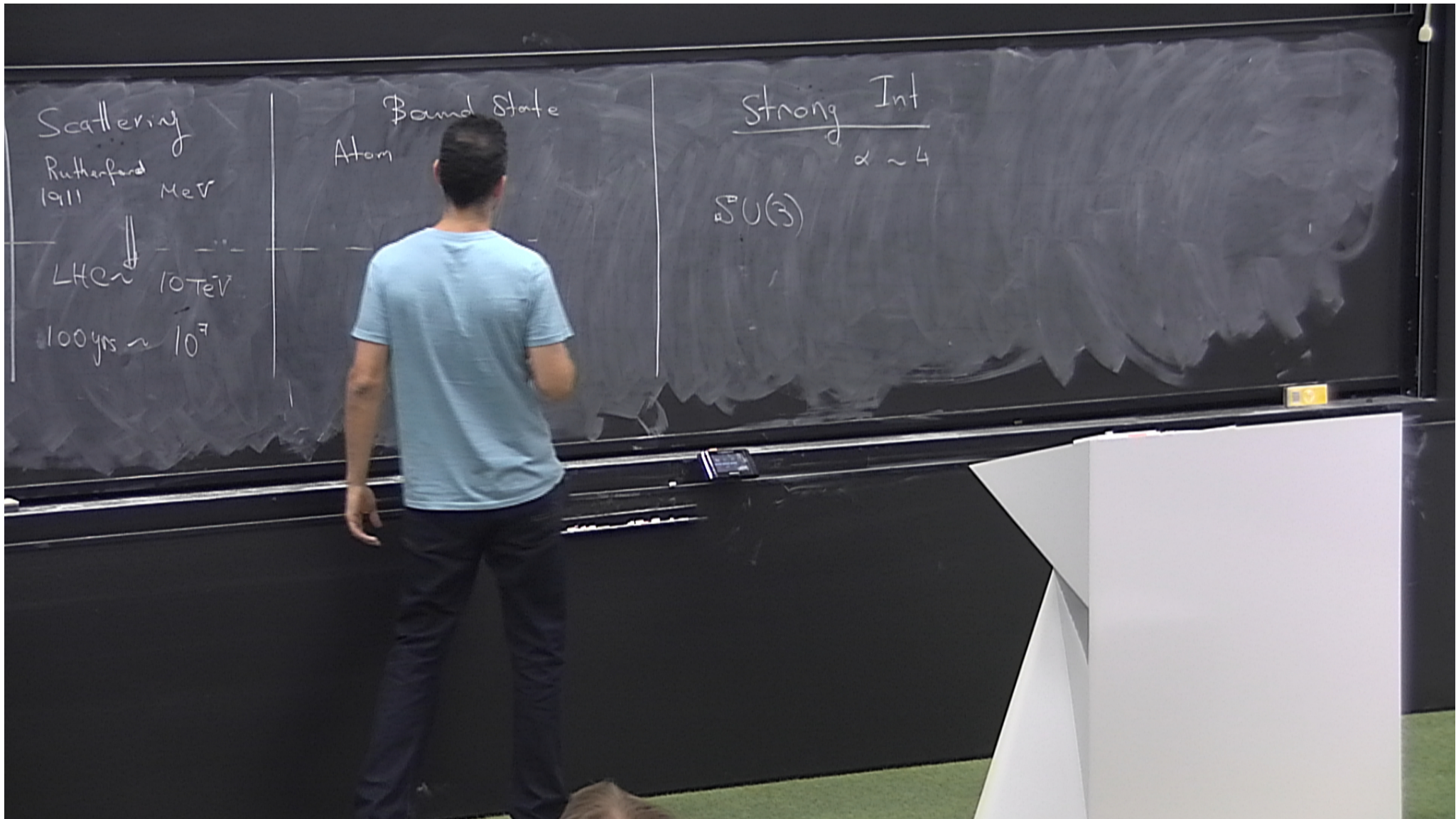
↓
LHC ~ 10 TeV

100 yrs ~ 10^7

Bound State

Strong Int
 $\alpha \sim 4$

SU(3)



Scattering

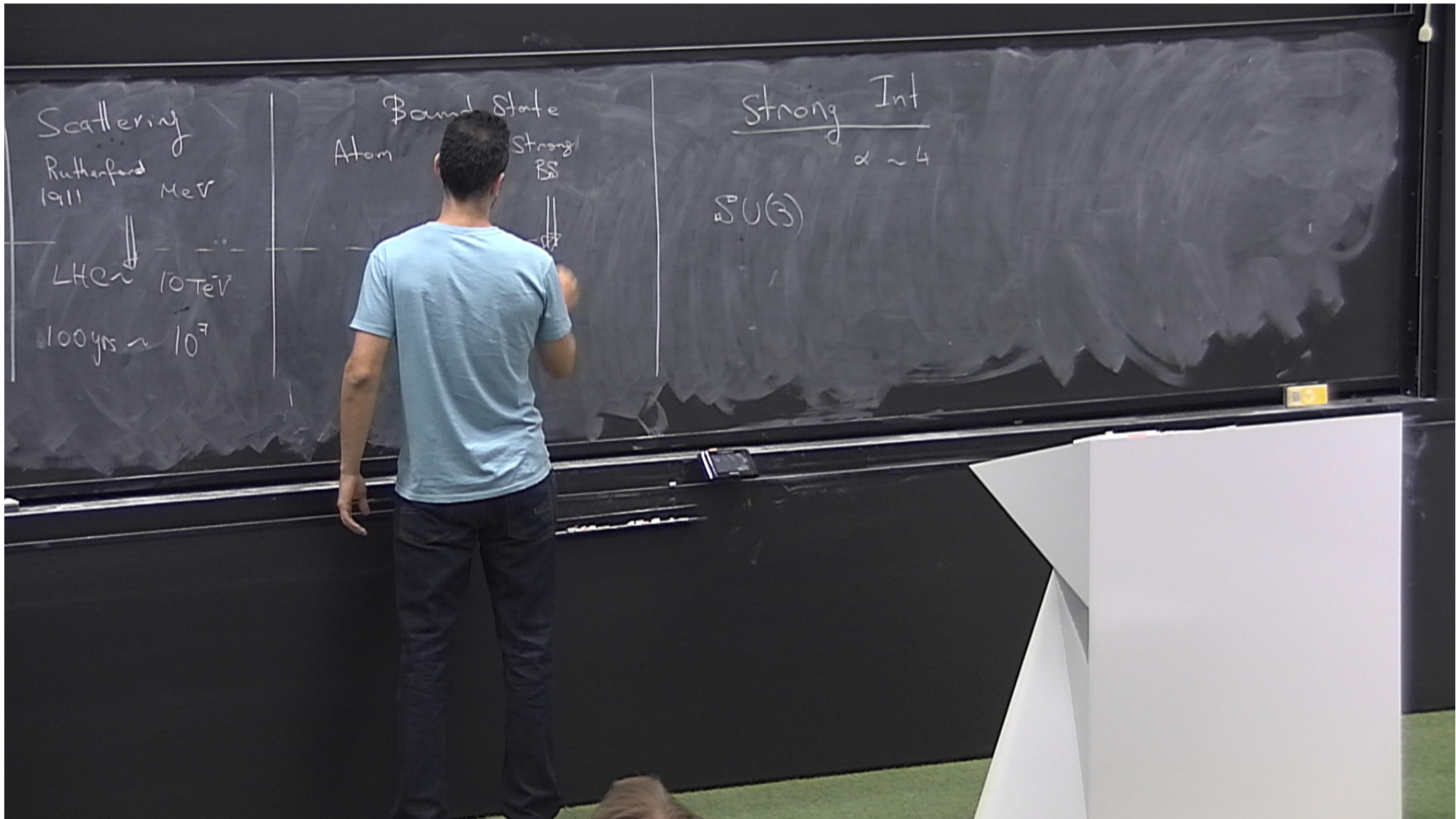
Rutherford
1911 MeV

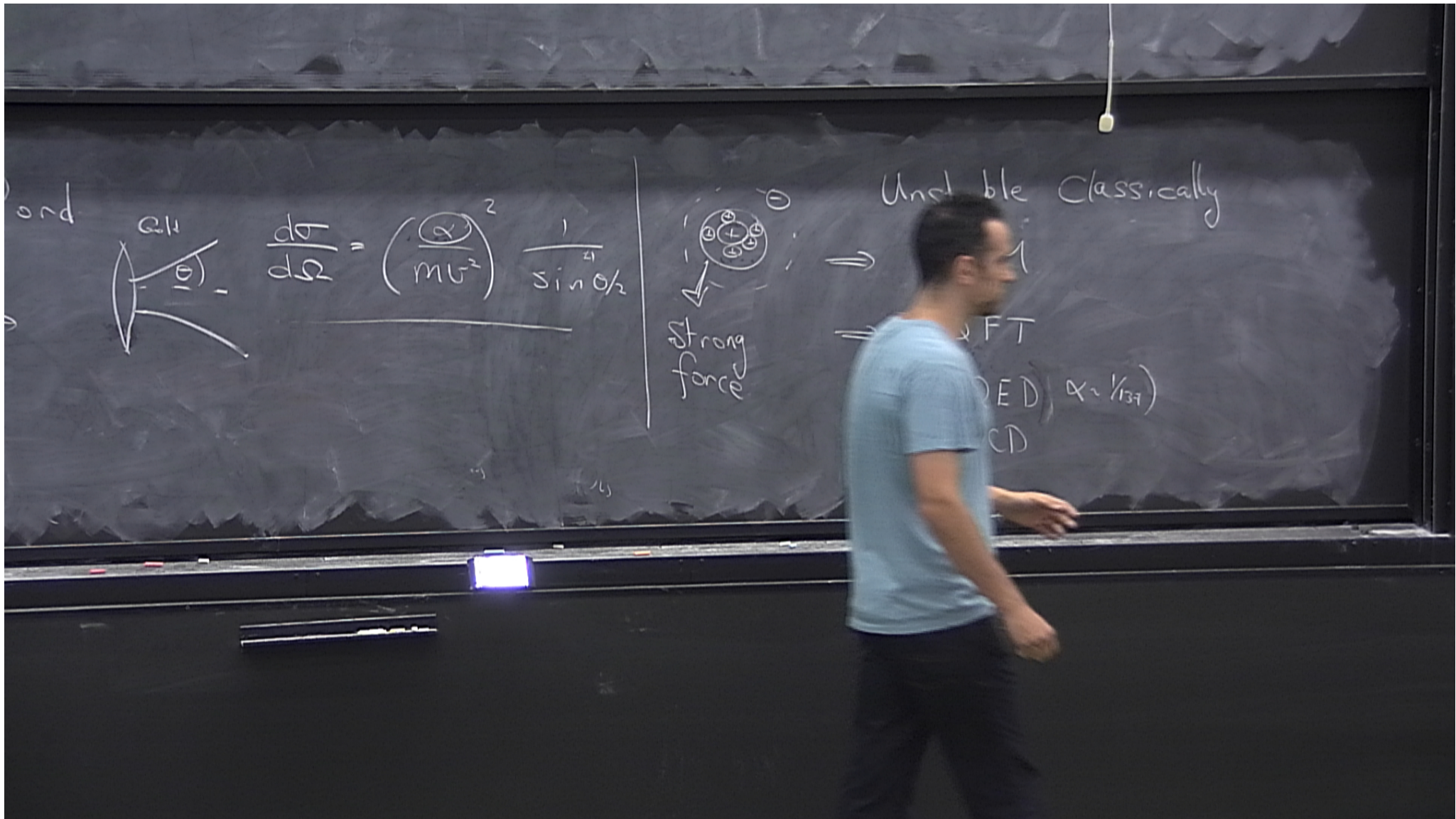
↓
LHC ~ 10 TeV

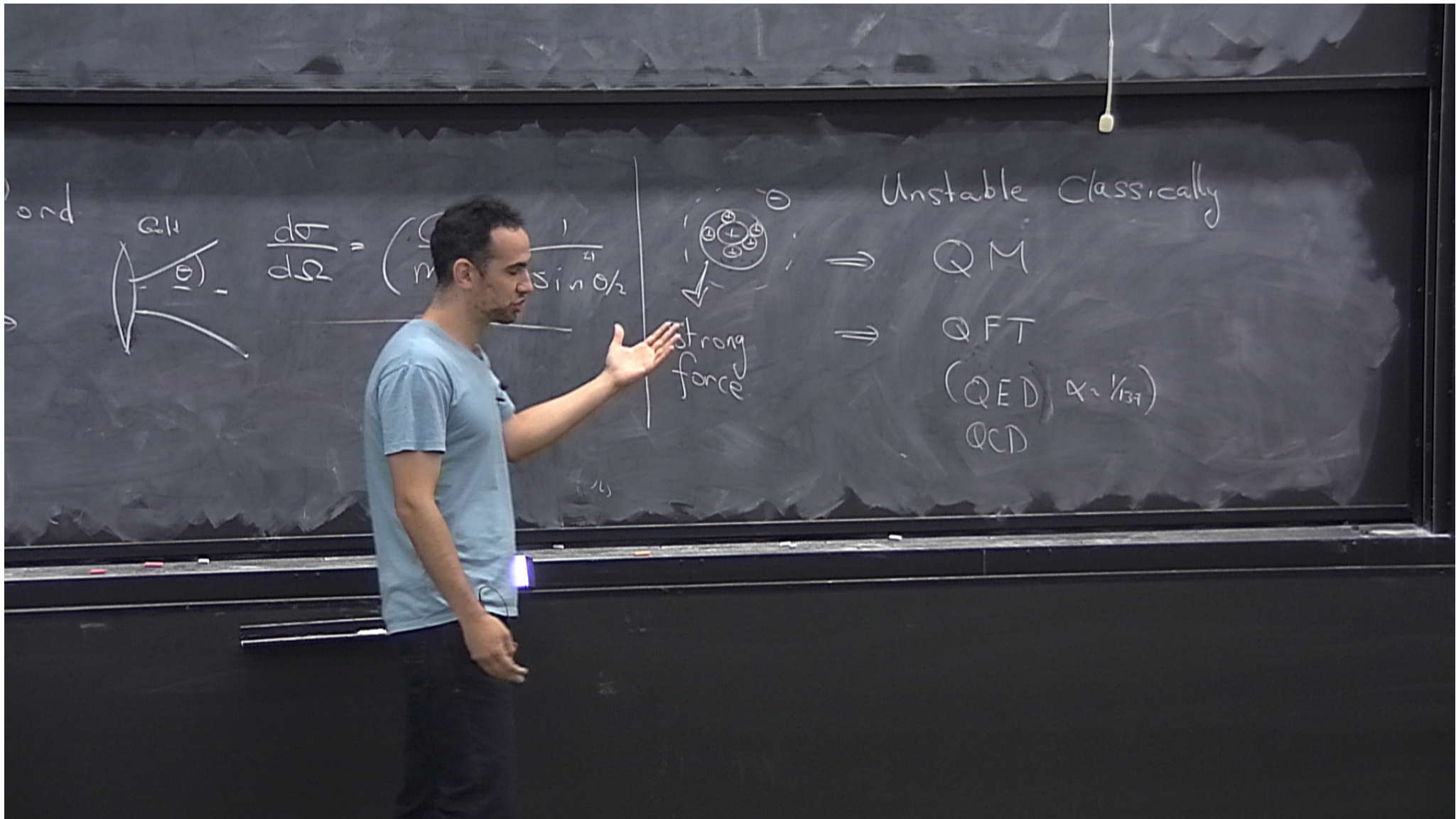
100 yrs ~ 10^7

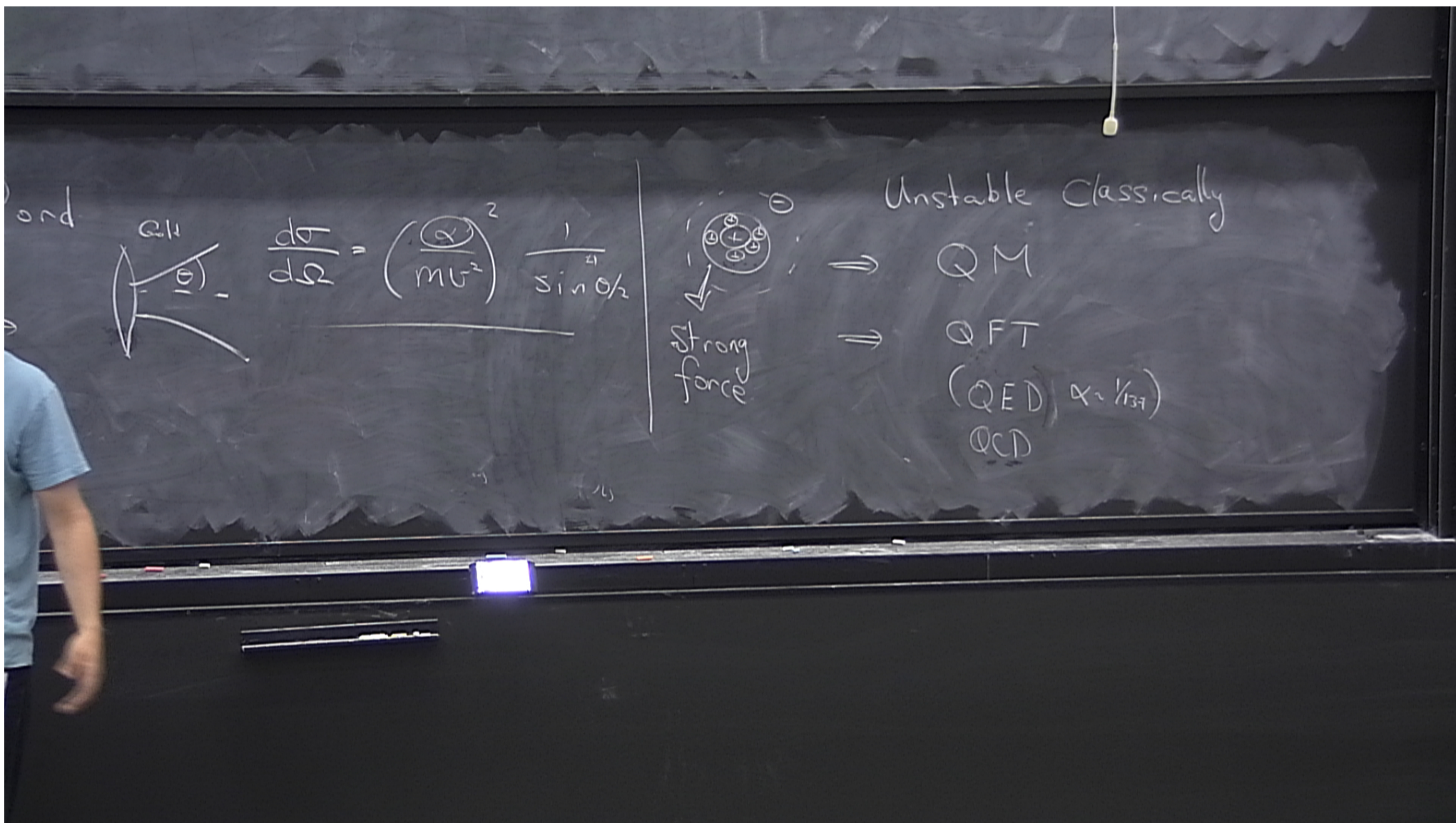
Bound State
Atom Strong
BS

Strong Int
 $\alpha \sim 4$
 $SU(3)$

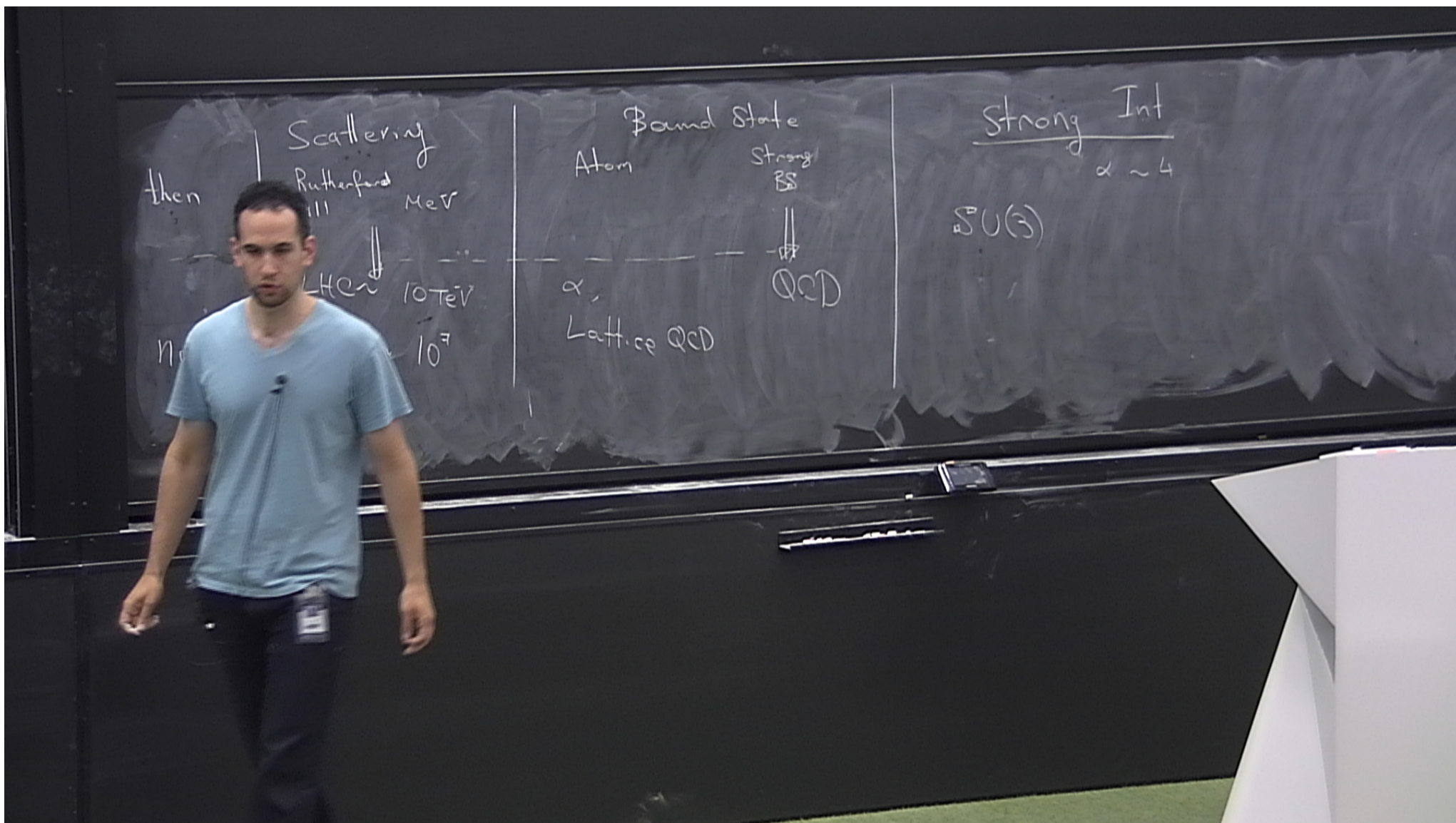


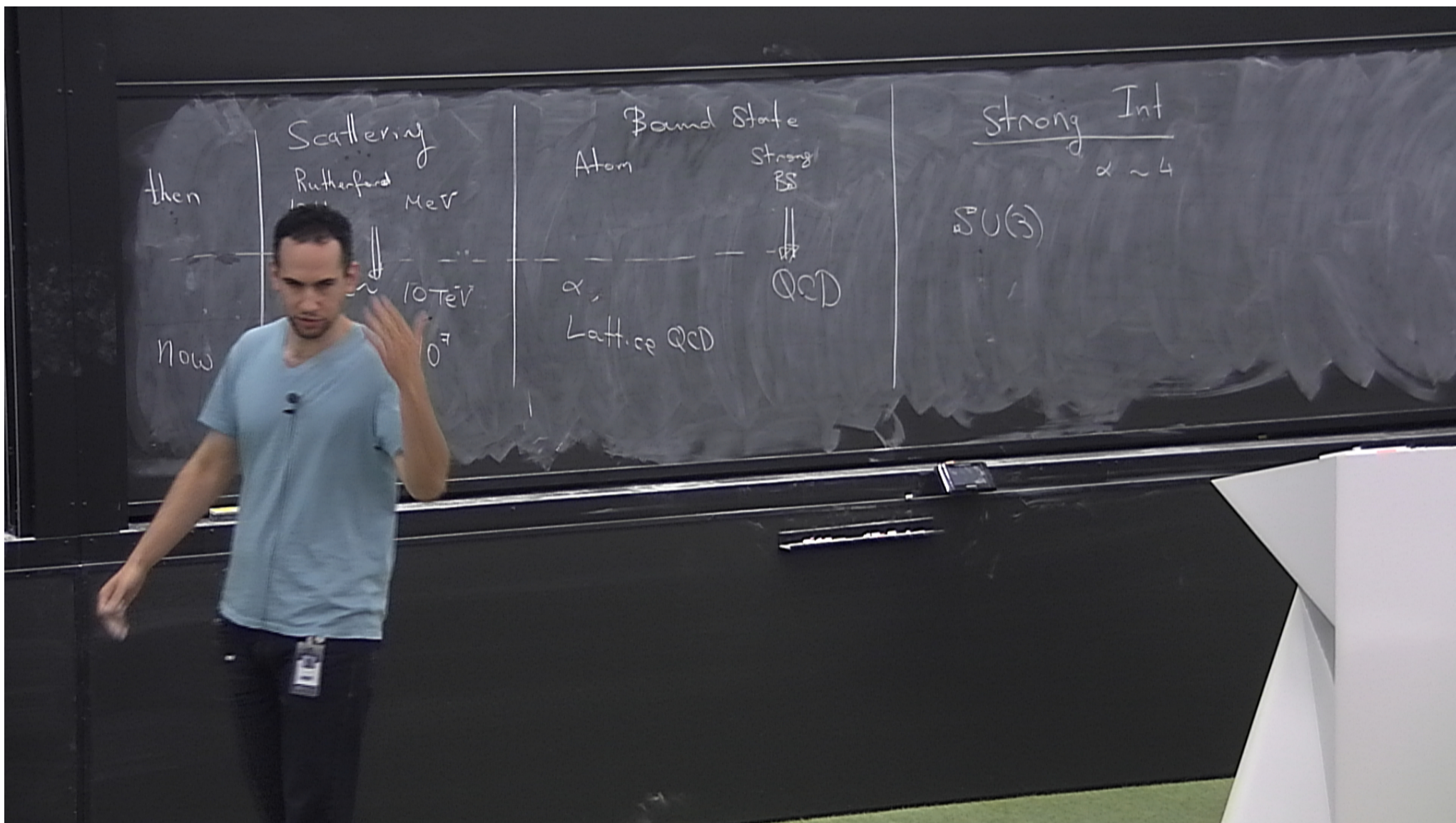


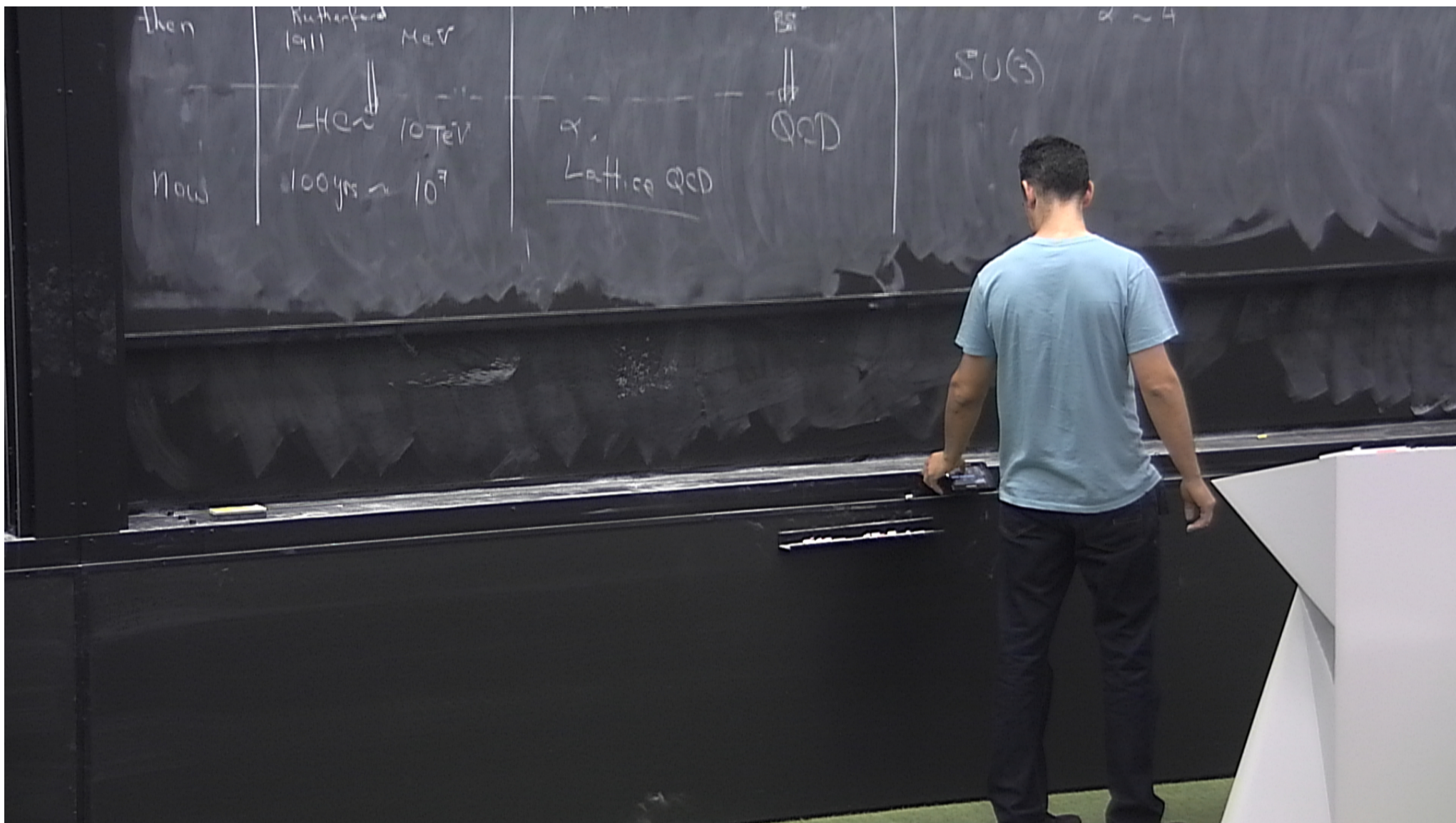


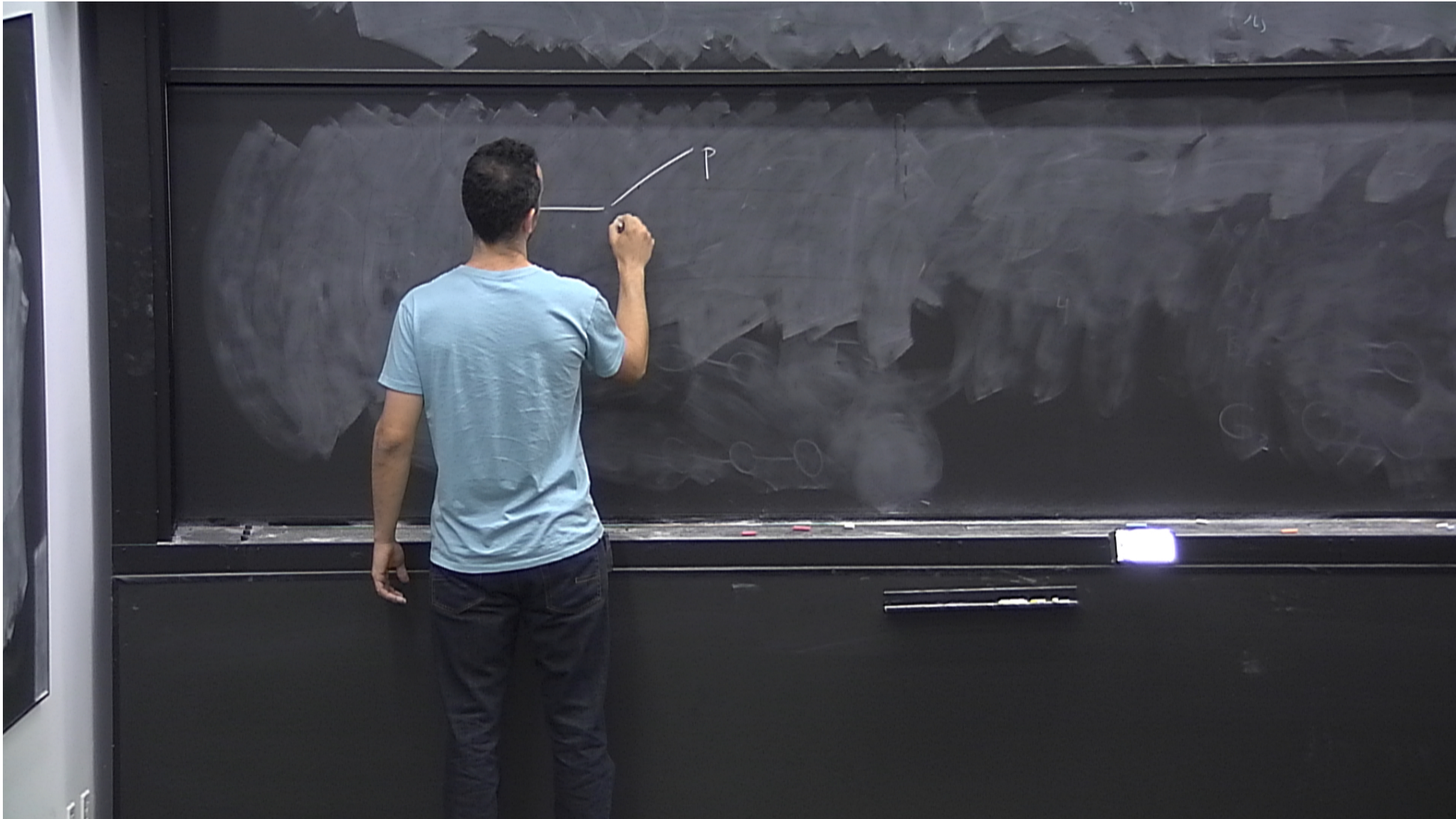


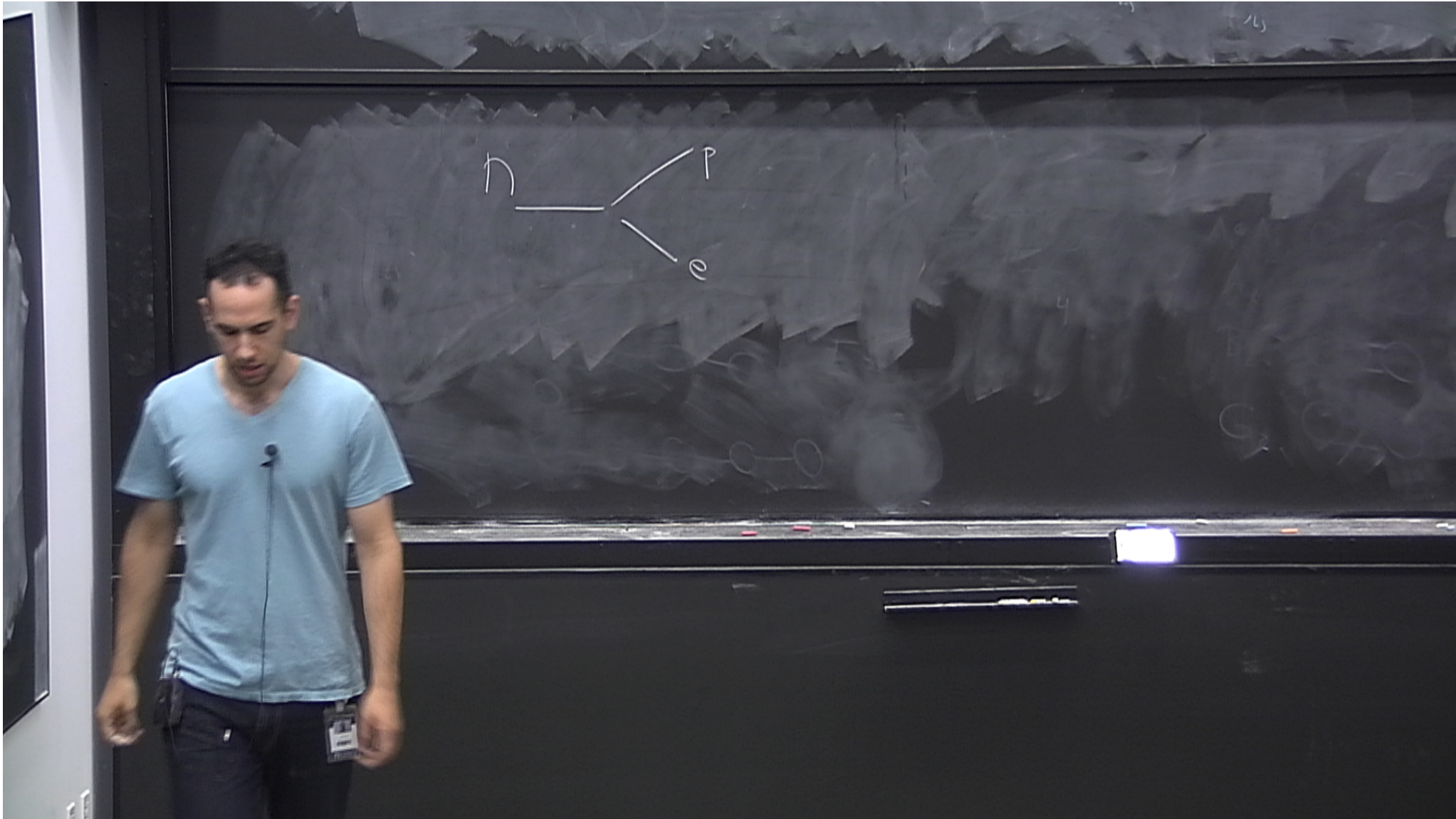
	Scattering	Bound State	Strong Int
then	Rutherford 1911 MeV	Atom	$\alpha \sim 4$
	LHC	Strong BS	$SU(3)$
Now	100 yrs	QCD	

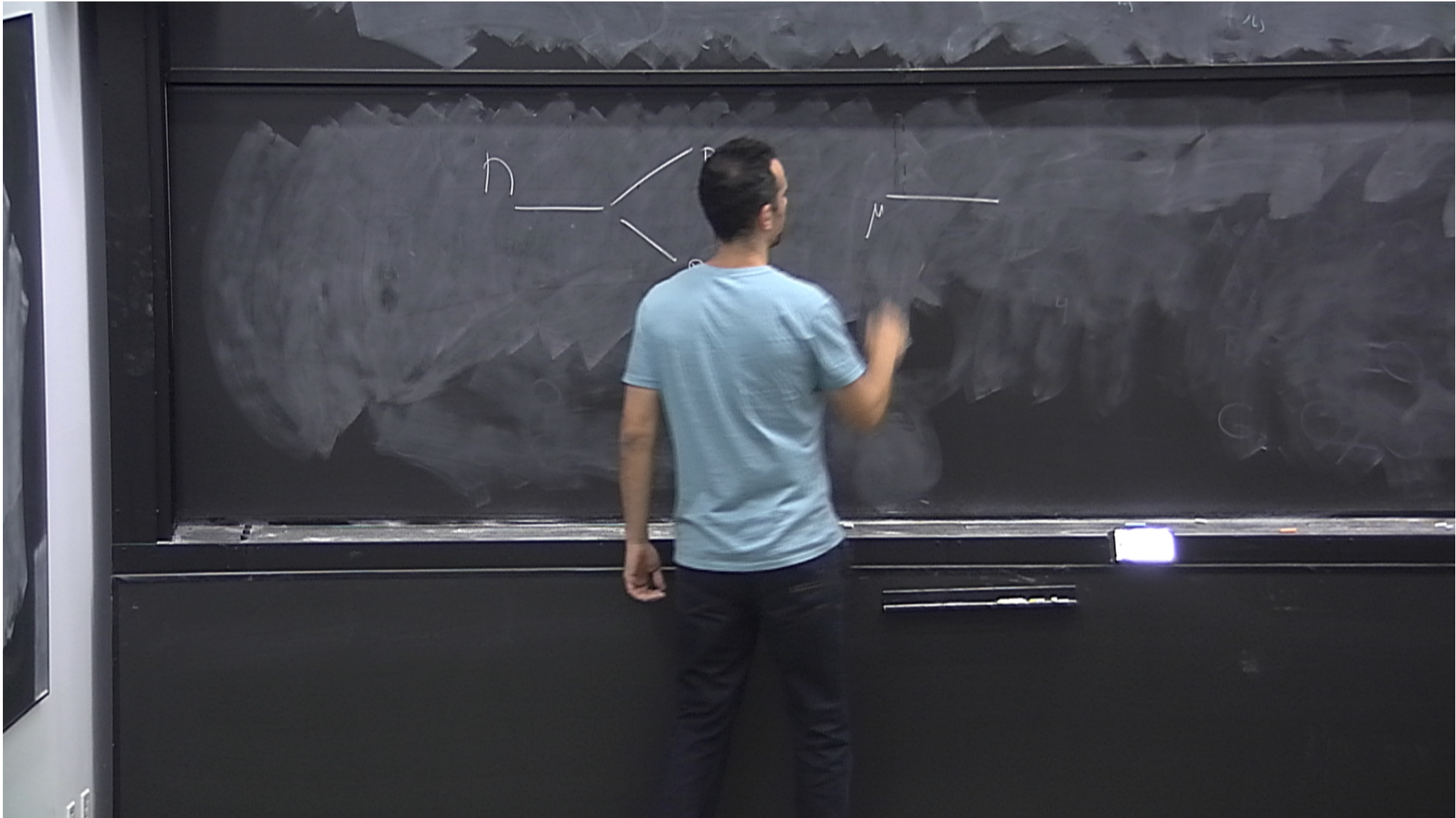


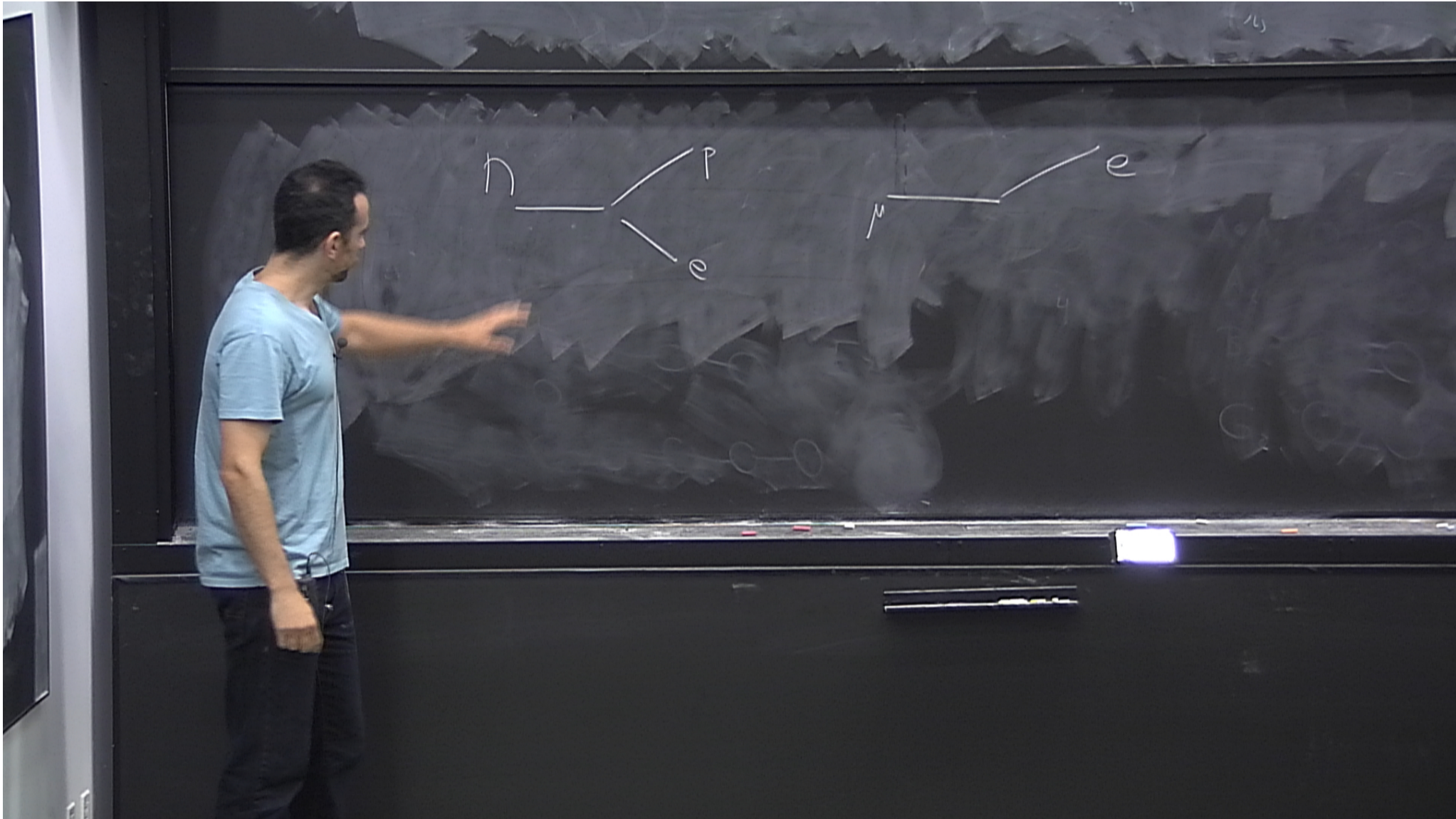


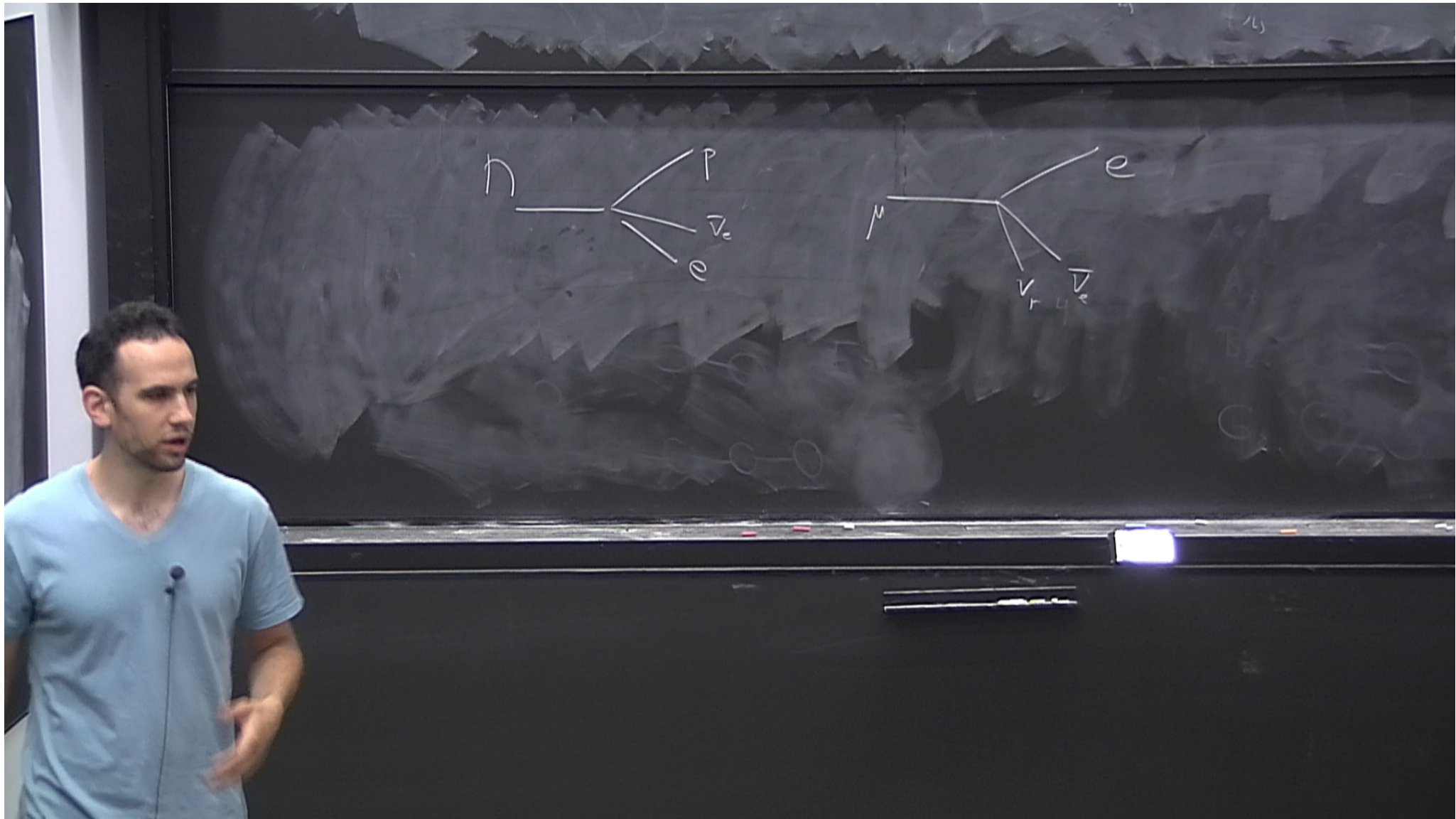


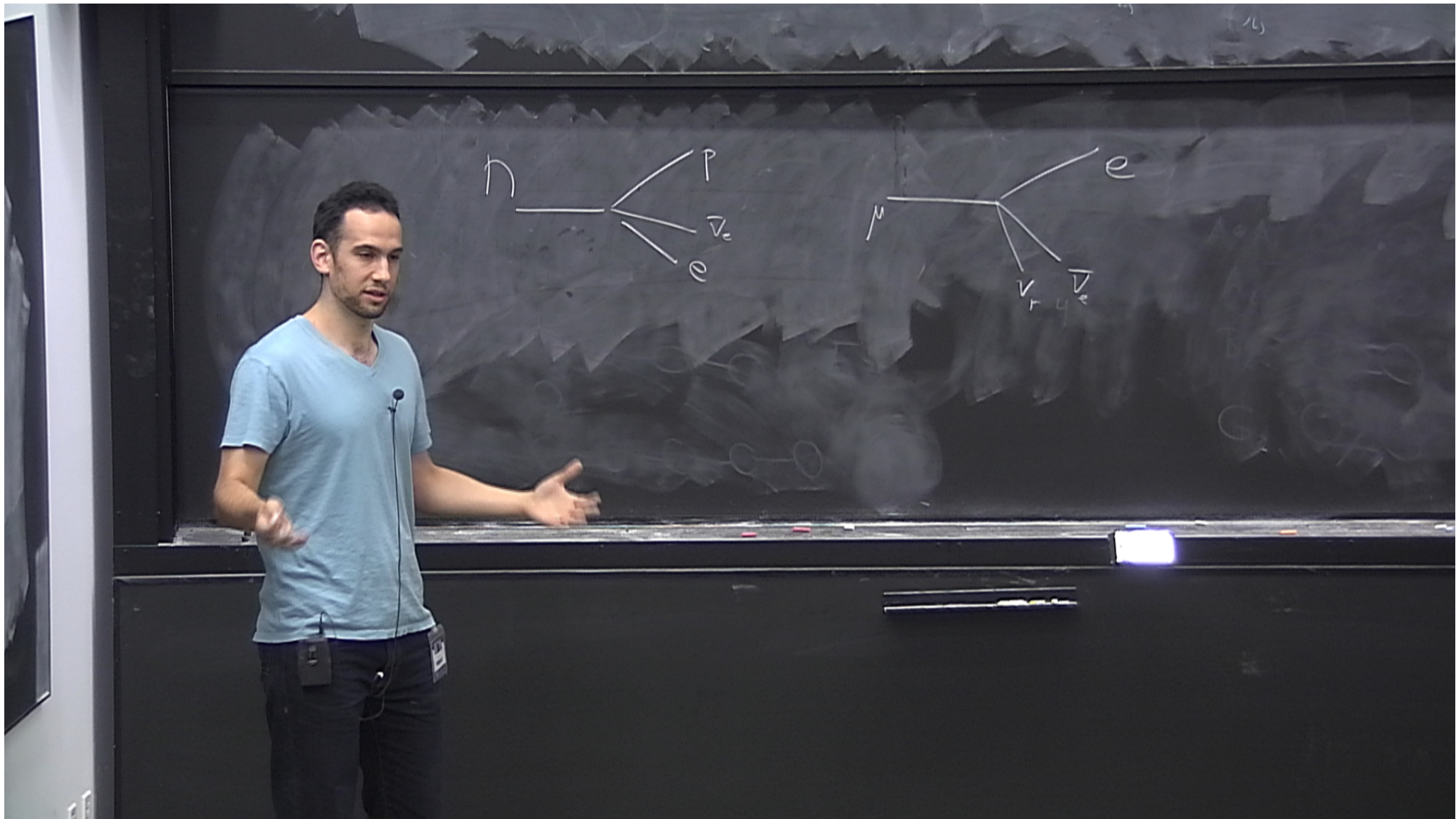


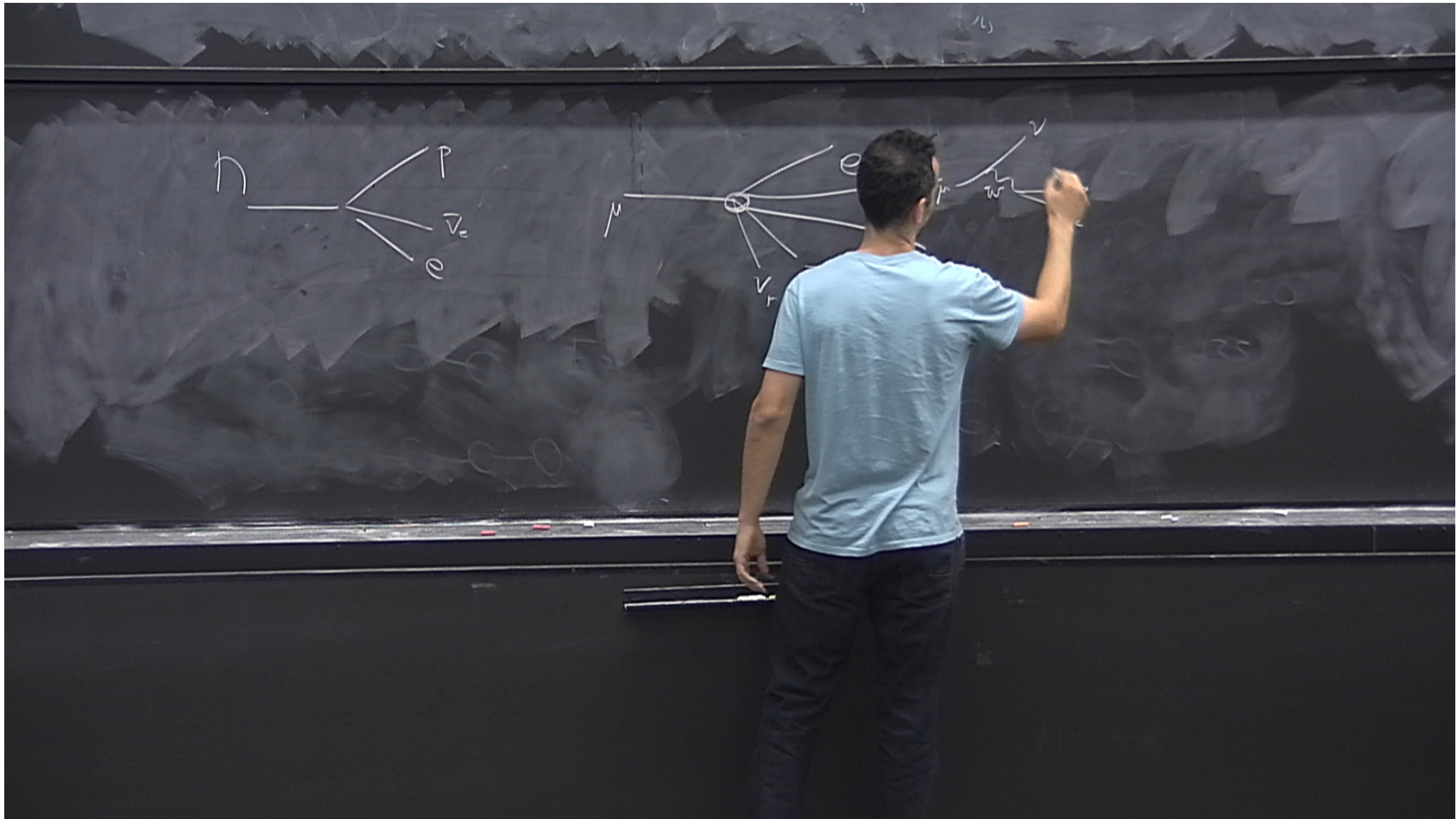


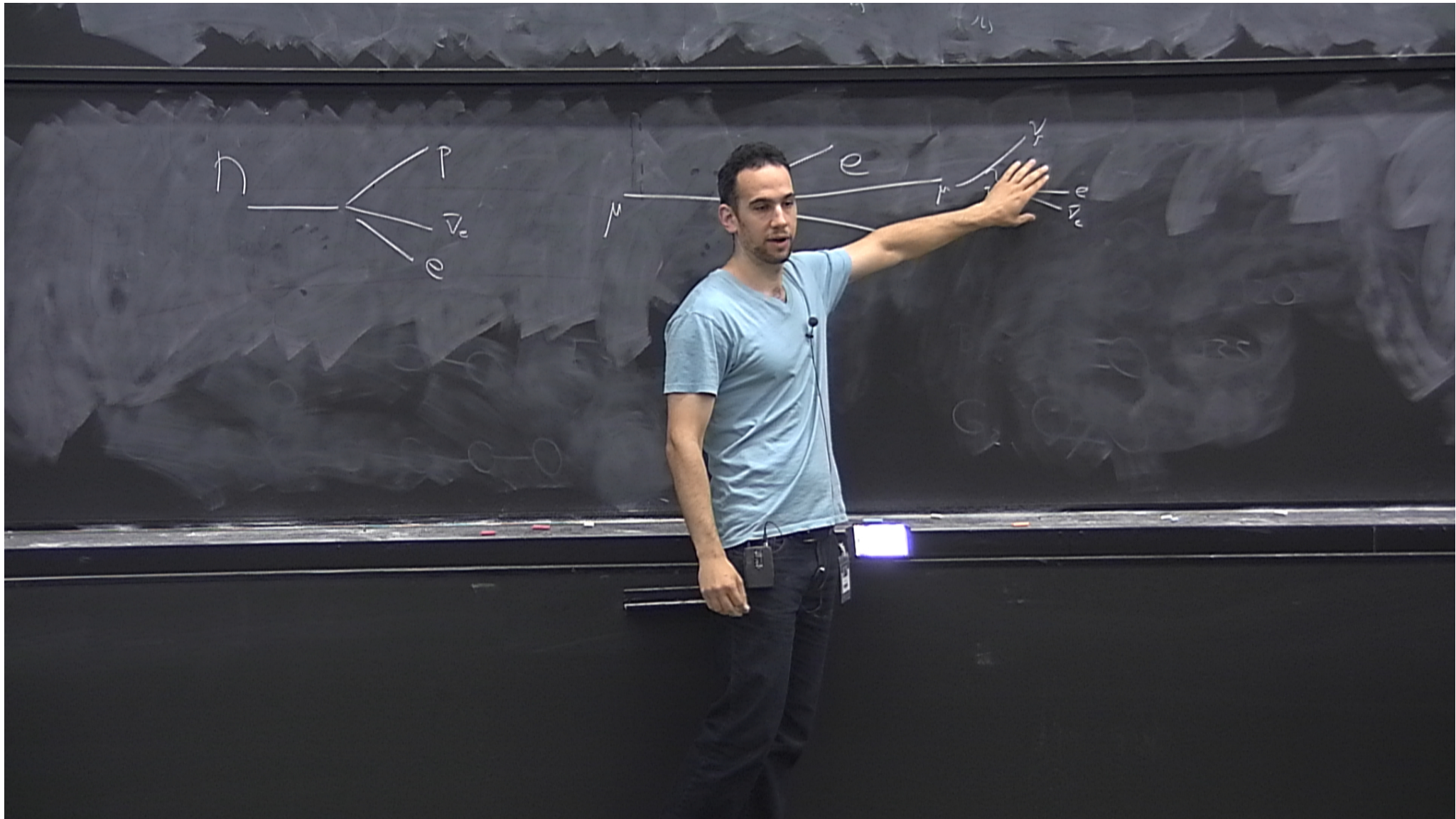


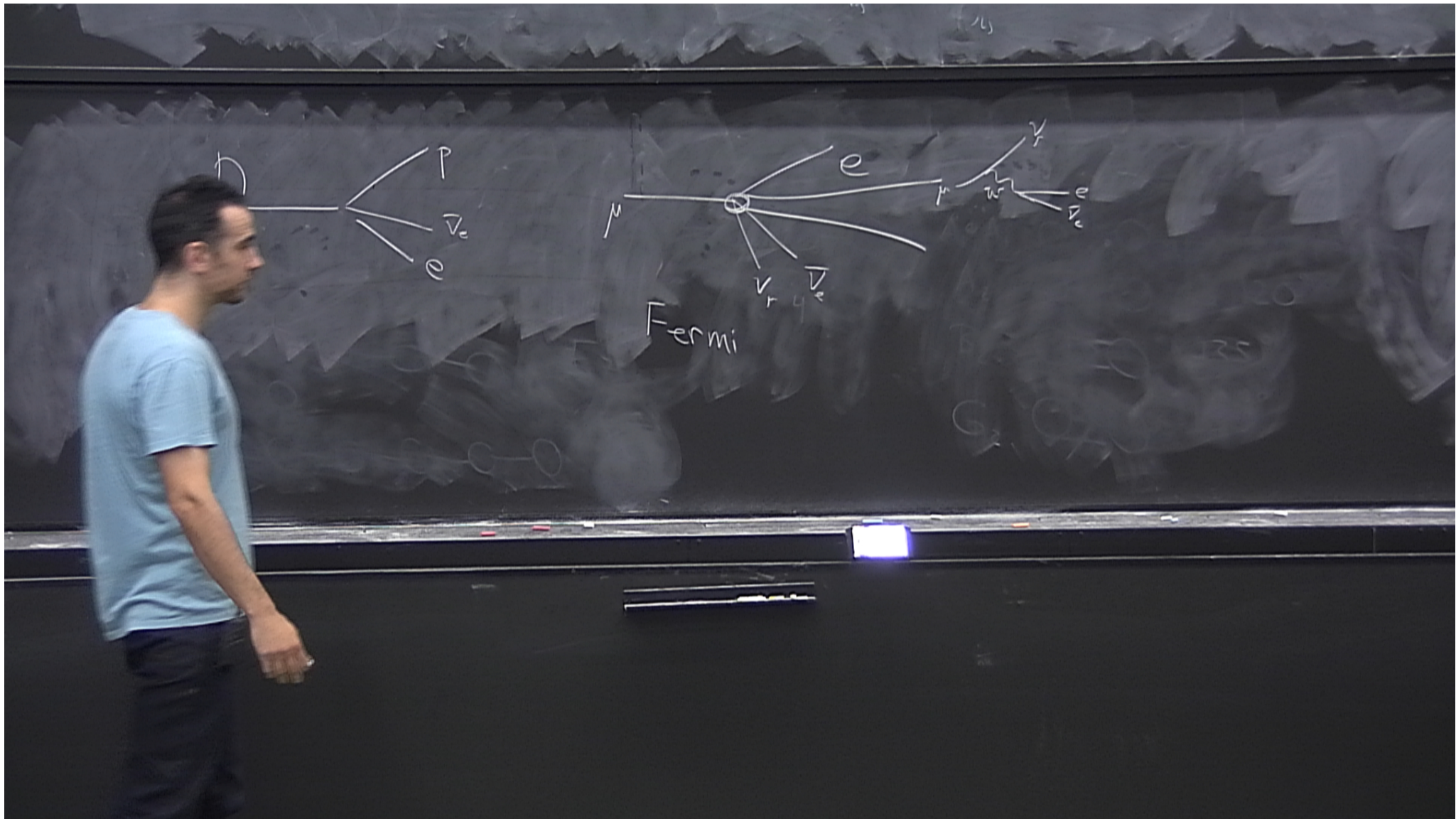


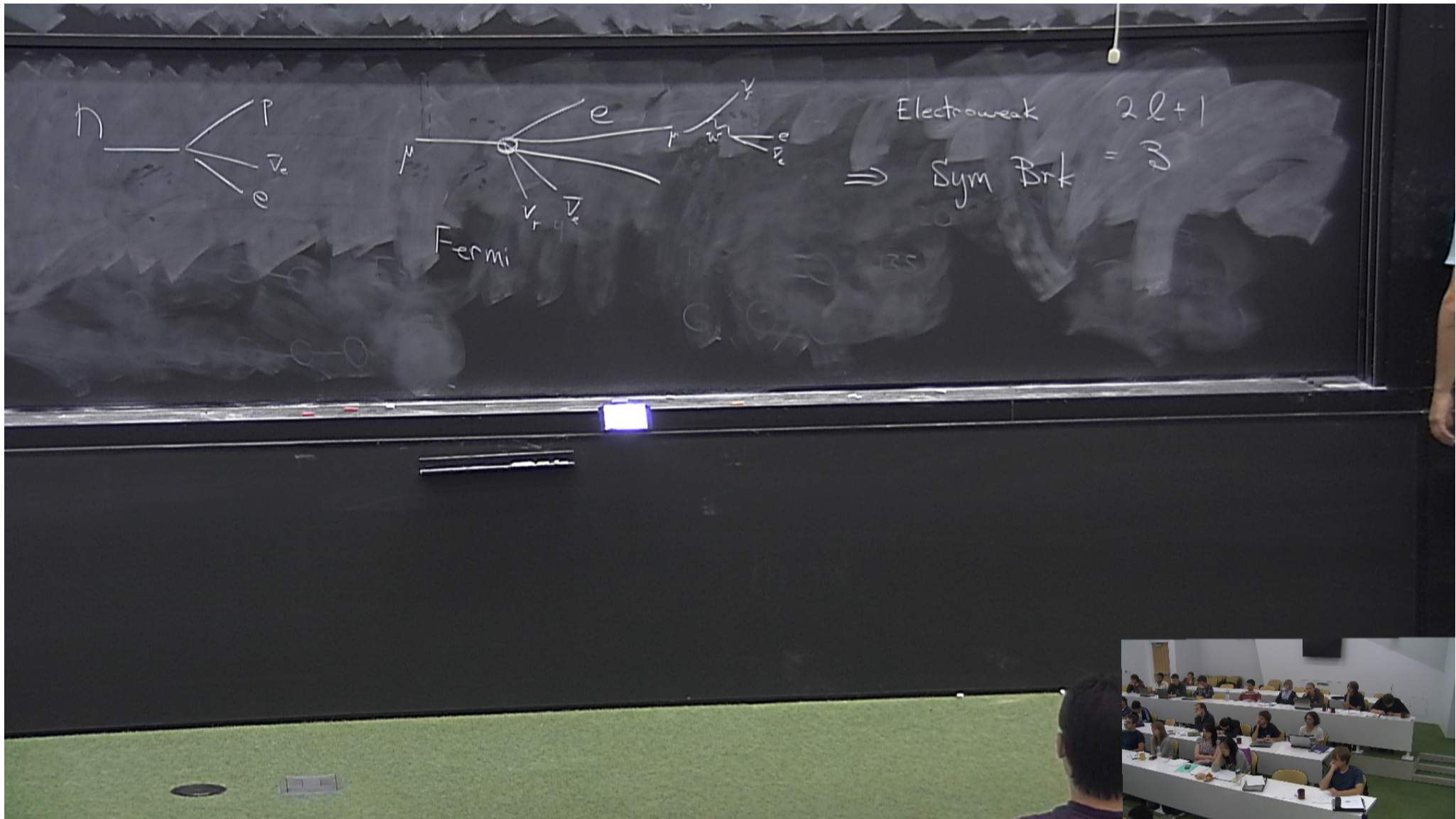








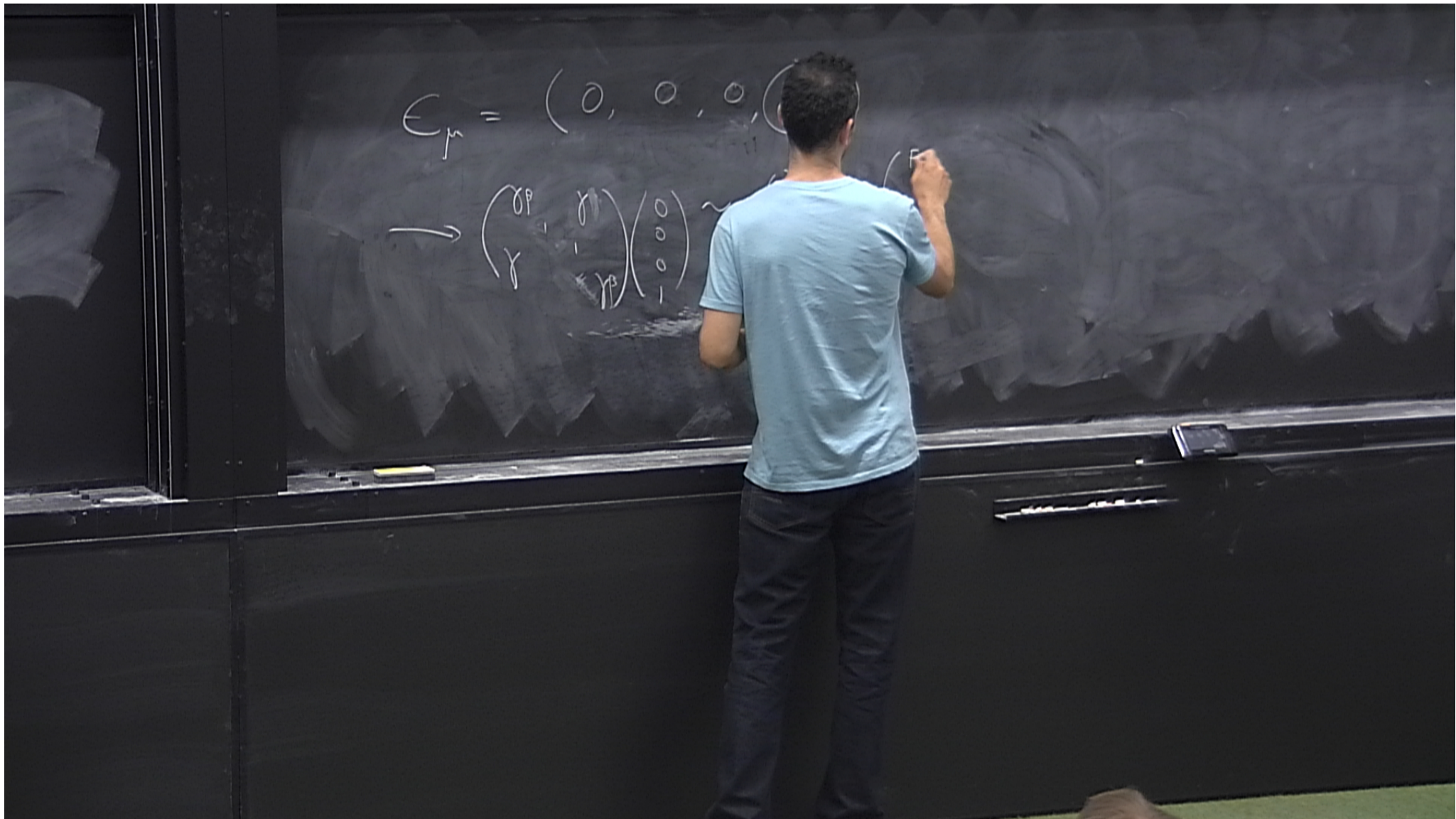






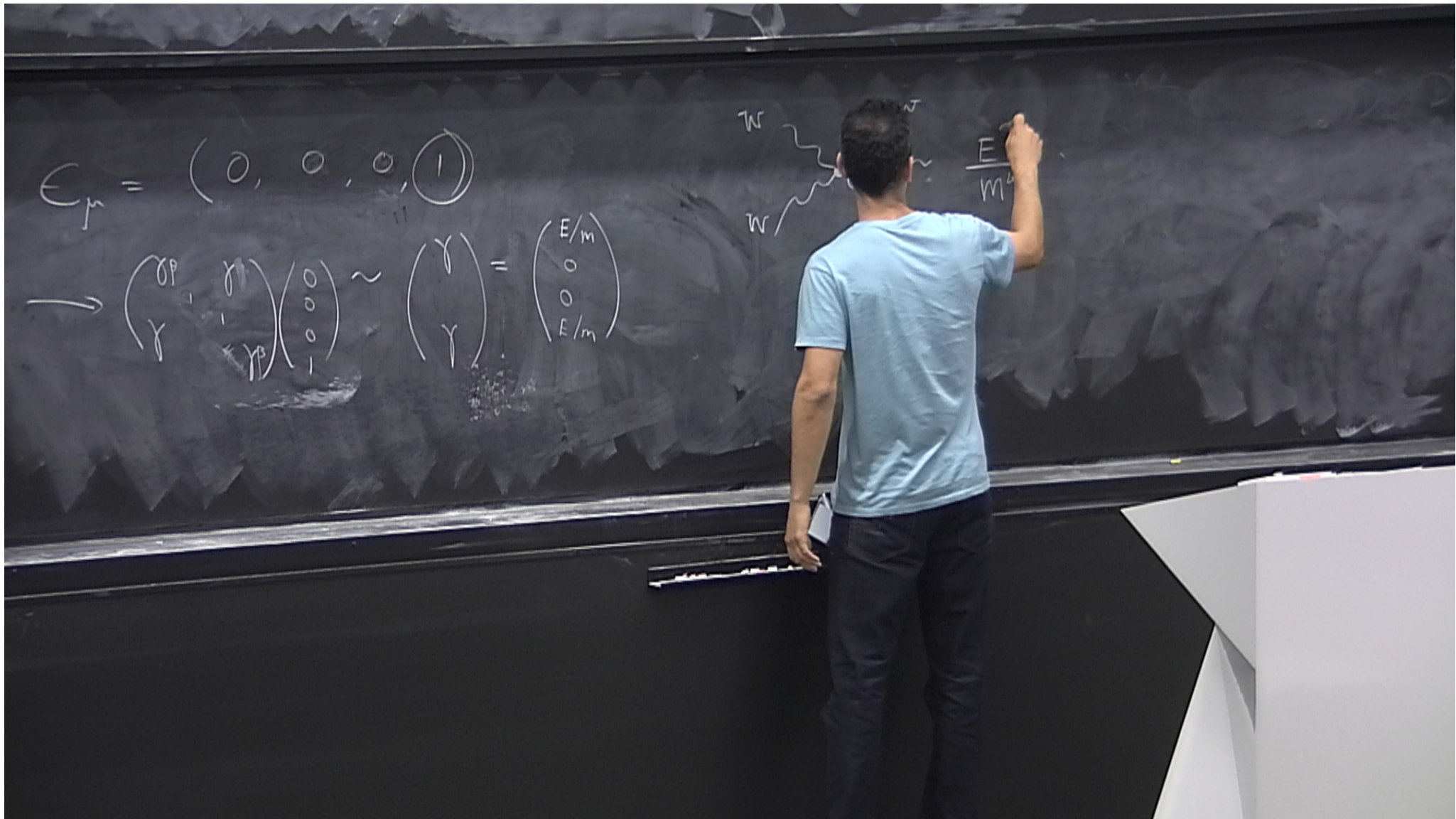
$$\epsilon_\mu = (0, 0, 0, \textcircled{1})$$

$$\rightarrow \begin{pmatrix} \gamma^0 & \gamma^1 \\ \gamma & \gamma^3 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} \sim \begin{pmatrix} \gamma \\ \gamma \end{pmatrix}$$



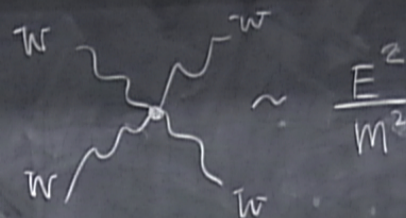
$$\epsilon_\mu = (0, 0, 0, \textcircled{1})$$

$$\rightarrow \begin{pmatrix} \gamma^0 & \gamma^1 \\ \gamma & \gamma^3 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} \sim \begin{pmatrix} \gamma \\ \gamma \end{pmatrix} = \begin{pmatrix} E/m \\ 0 \\ 0 \\ E/m \end{pmatrix}$$



$$\epsilon_\mu = (0, 0, 0, 1)$$

$$\rightarrow \begin{pmatrix} \gamma^0 & \gamma^1 \\ \gamma^2 & \gamma^3 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} \sim \begin{pmatrix} \gamma \\ \gamma \end{pmatrix} = \begin{pmatrix} E/m \\ 0 \\ 0 \\ E/m \end{pmatrix}$$

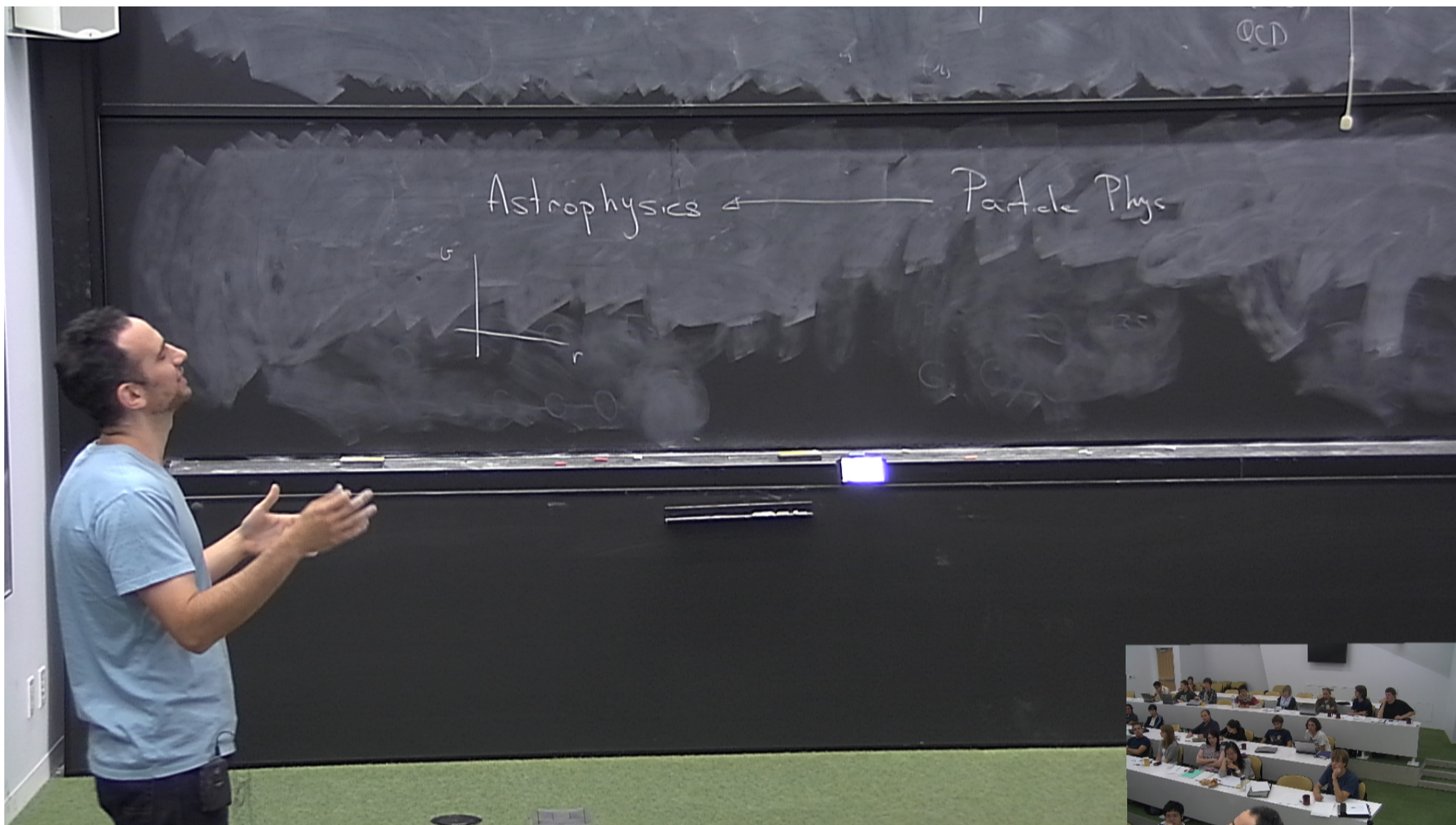


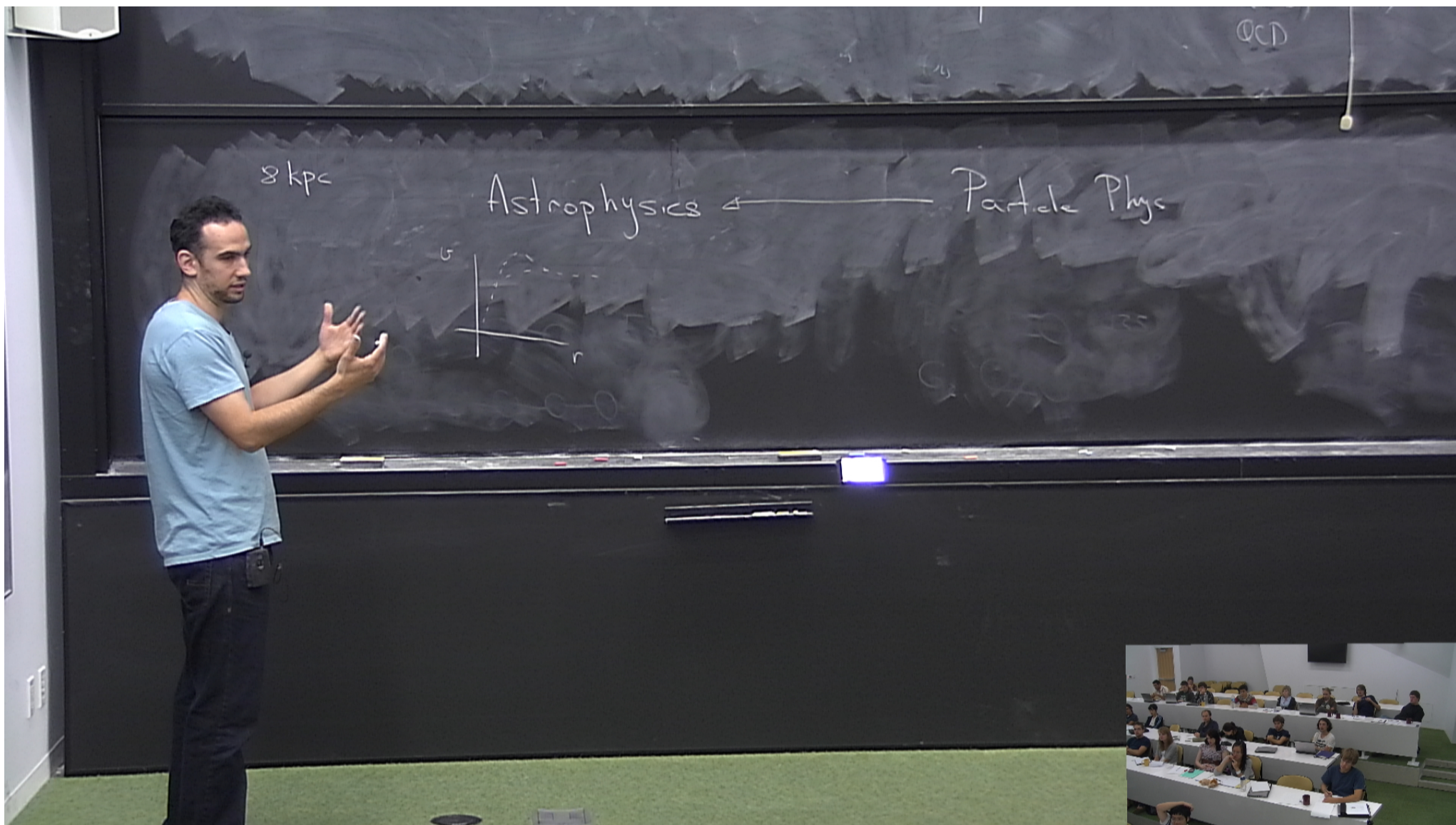
$$\epsilon_\mu = (0, 0, 0, 1)$$

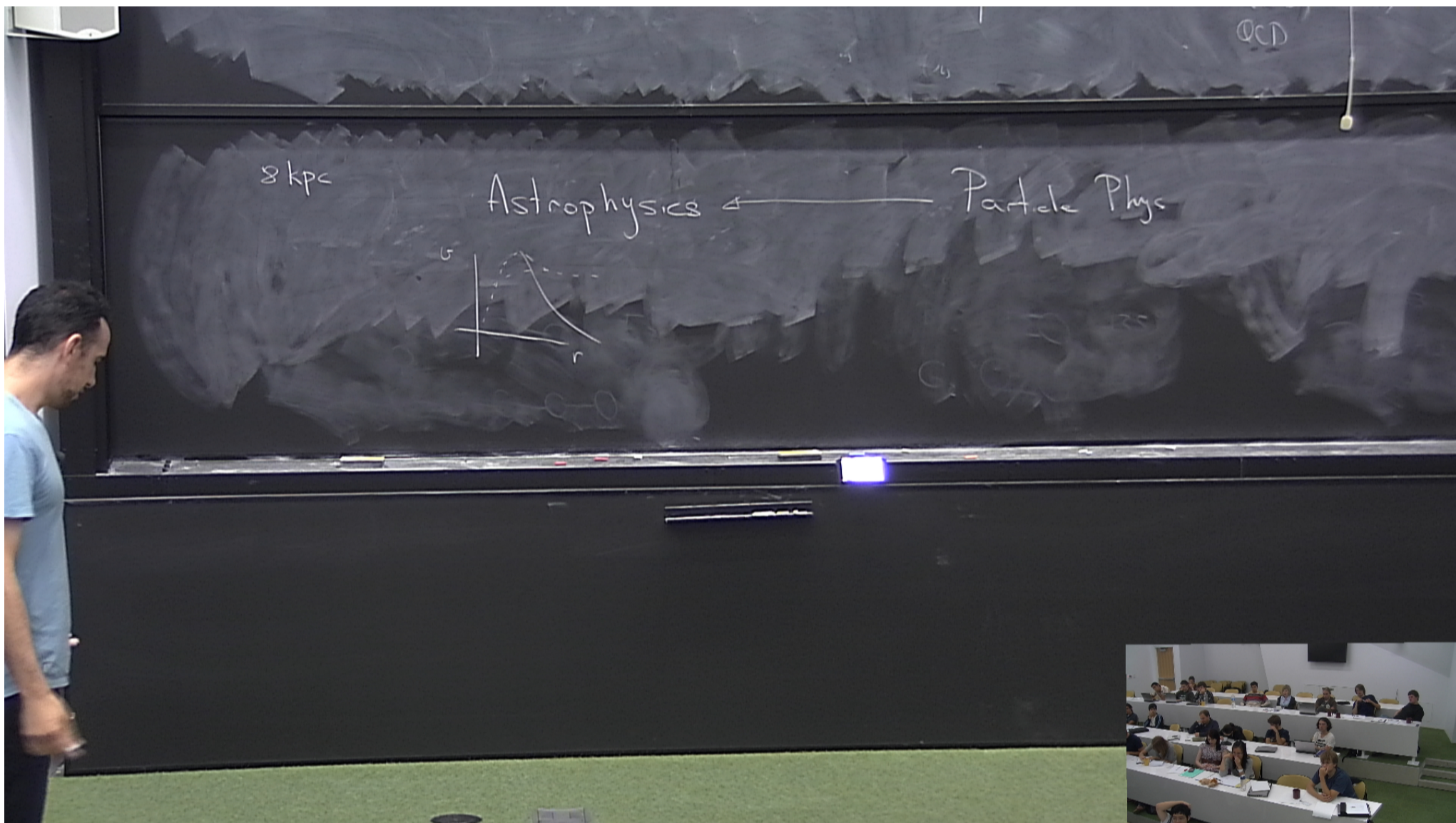
$$\rightarrow \begin{pmatrix} \gamma^0 & \gamma^1 \\ \gamma^2 & \gamma^3 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} \sim \begin{pmatrix} \gamma \\ \gamma \end{pmatrix} = \begin{pmatrix} E/m \\ 0 \\ 0 \\ E/m \end{pmatrix}$$

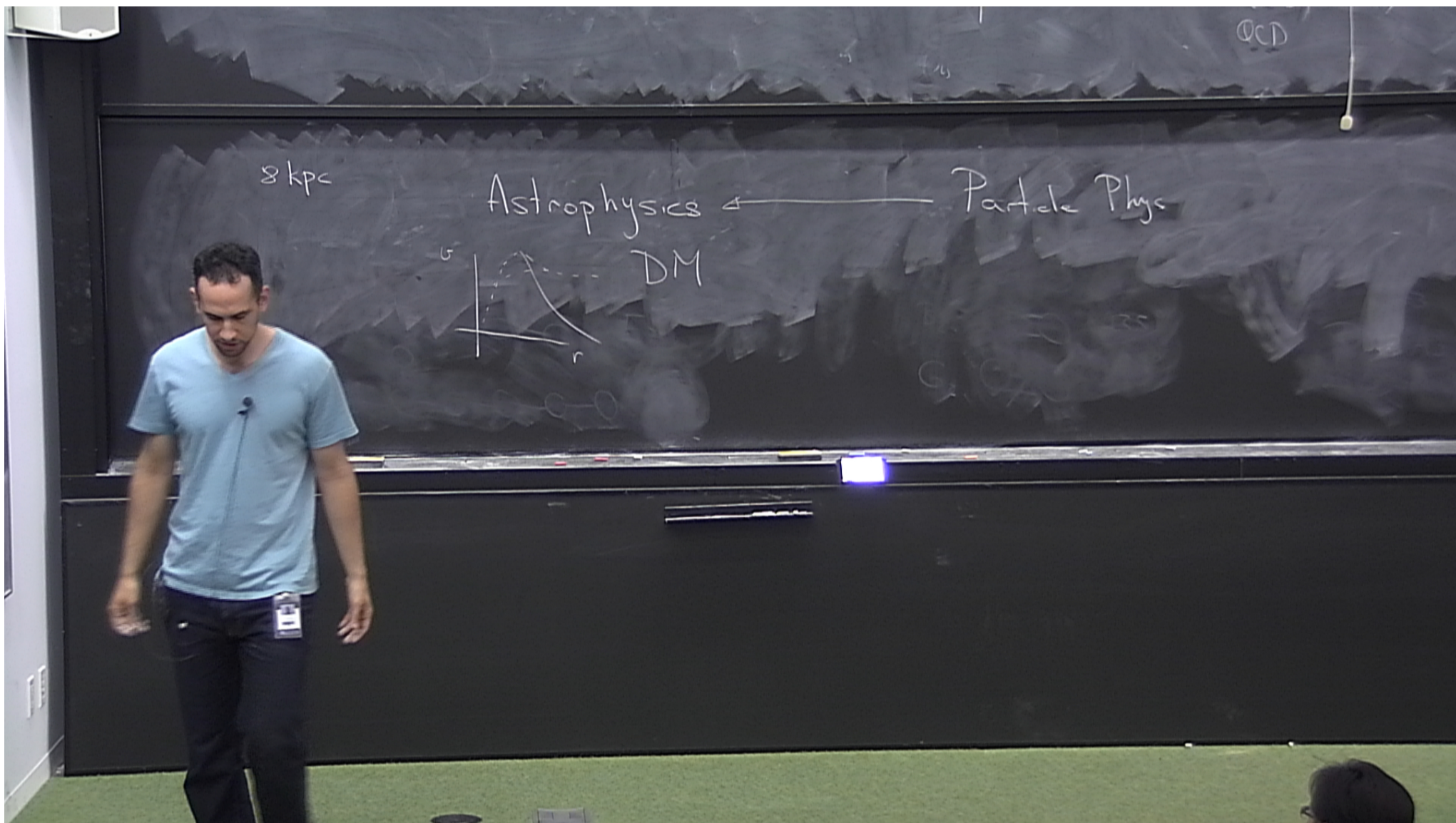
$$+ \begin{array}{c} \text{w} \quad \text{w} \\ \diagdown \quad \diagup \\ \text{w} \quad \text{w} \end{array} \sim \frac{E^2}{m^2}$$

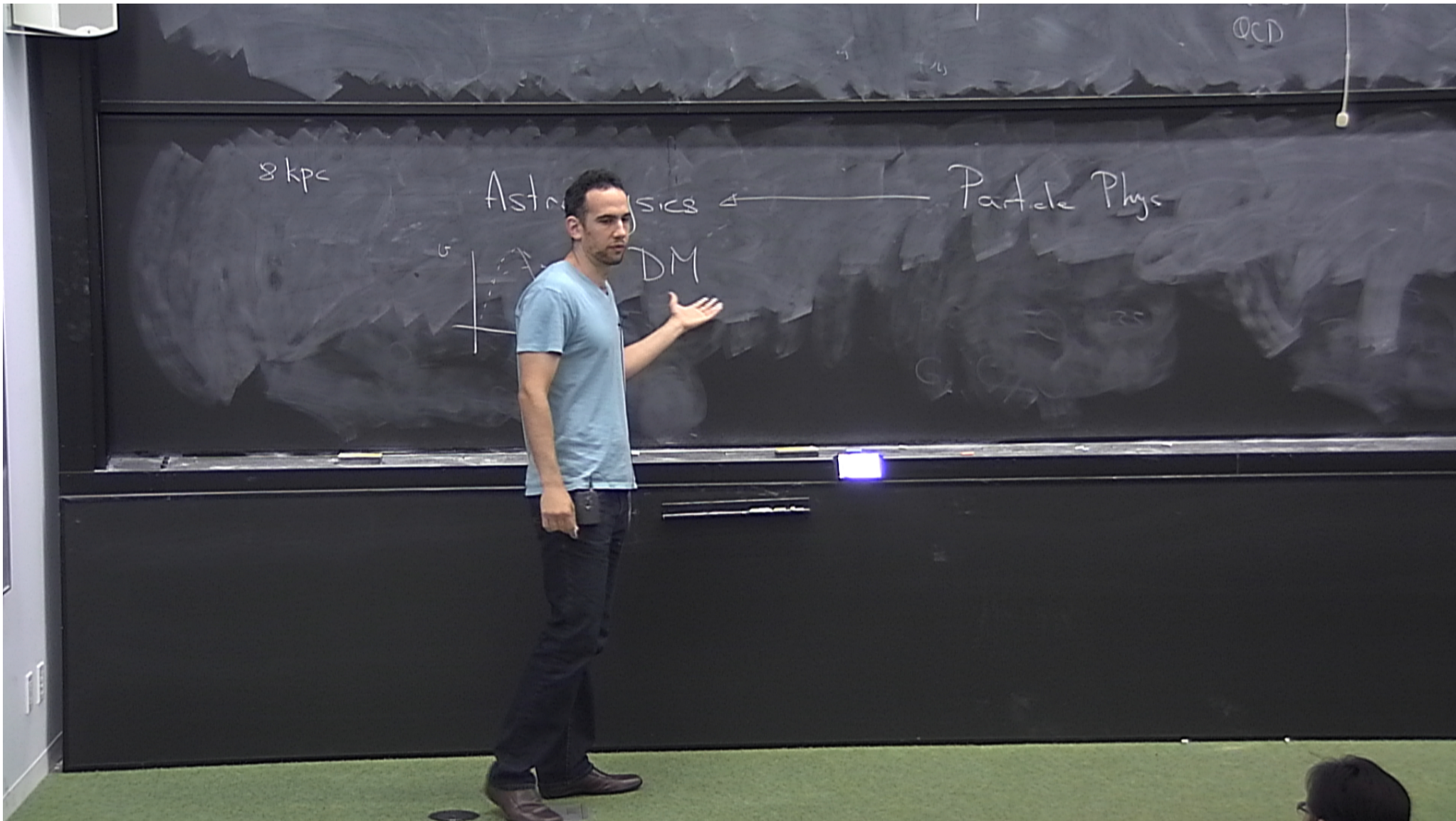
$$+ \begin{array}{c} \text{w} \quad \text{w} \\ \diagdown \quad \diagup \\ \text{w} \quad \text{w} \end{array} \sim -\frac{E^2}{m^2}$$

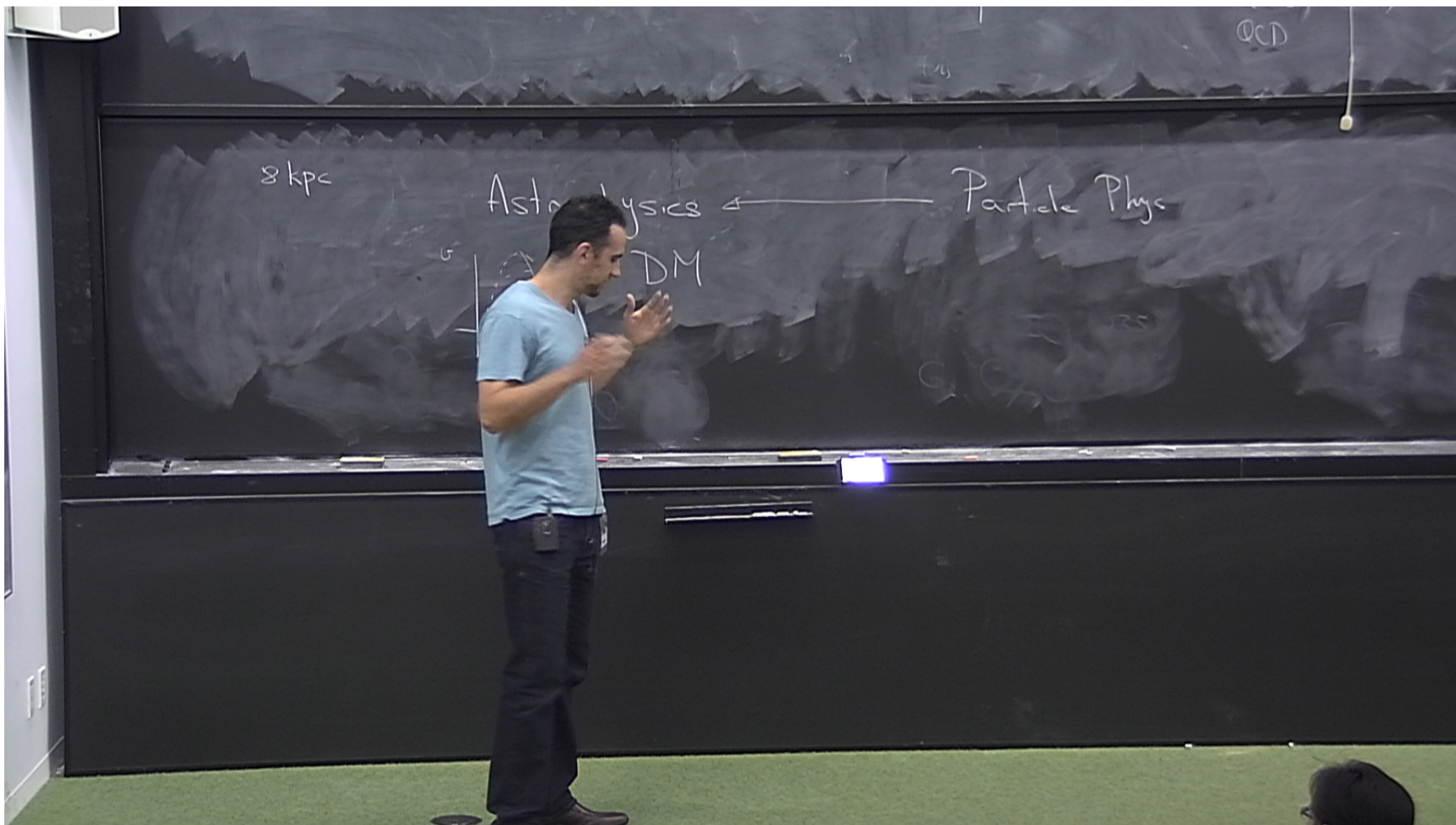


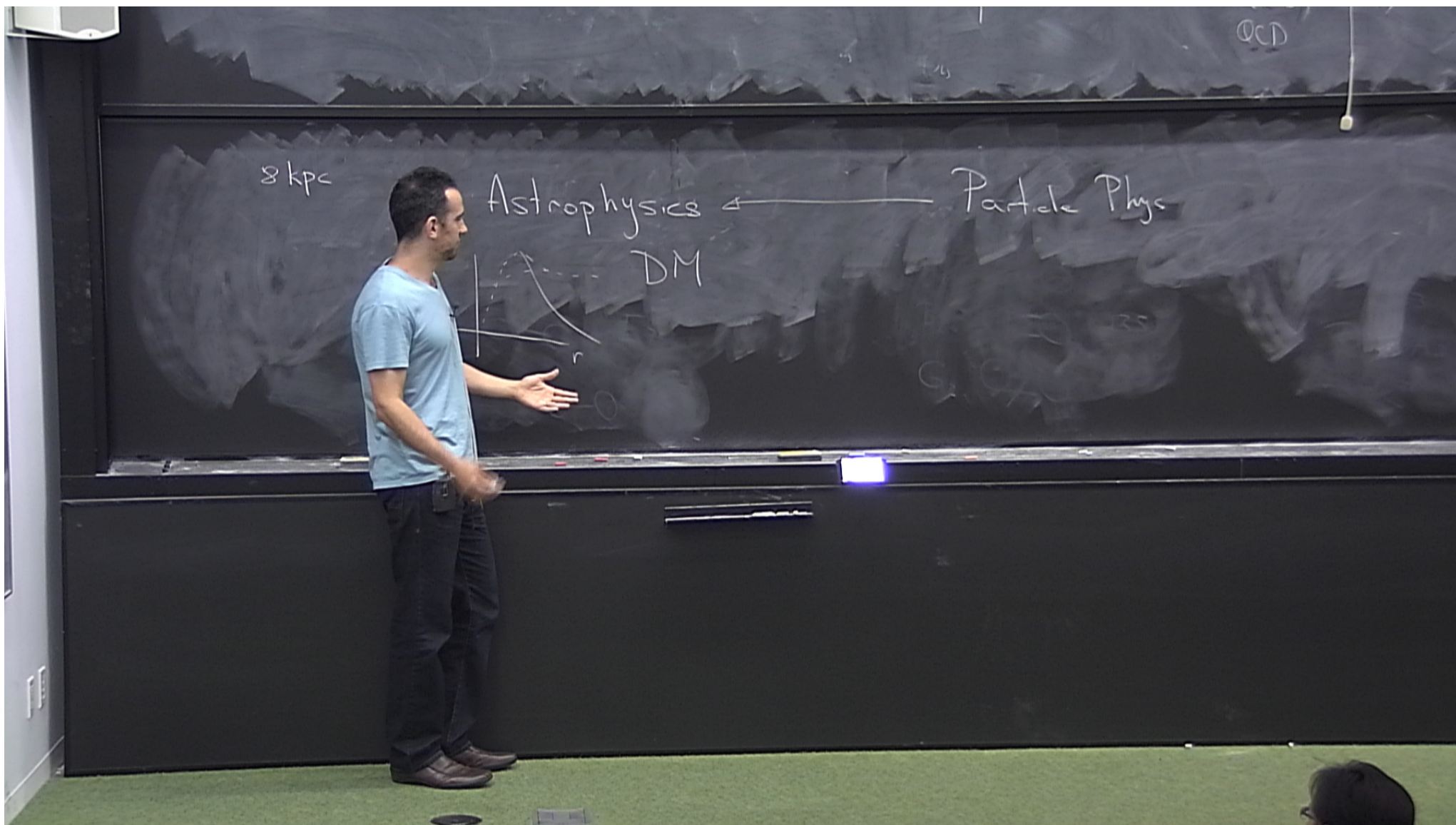












8 kpc

Astrophysics

Particle Phys



8 kpc

Astrophysics

Particle Phys.

St

