Title: Special Relativity 4 - Einstein's Speed of Light Principle ("Principle 2")

Date: Aug 11, 2008 09:00 AM

URL: http://pirsa.org/08080063

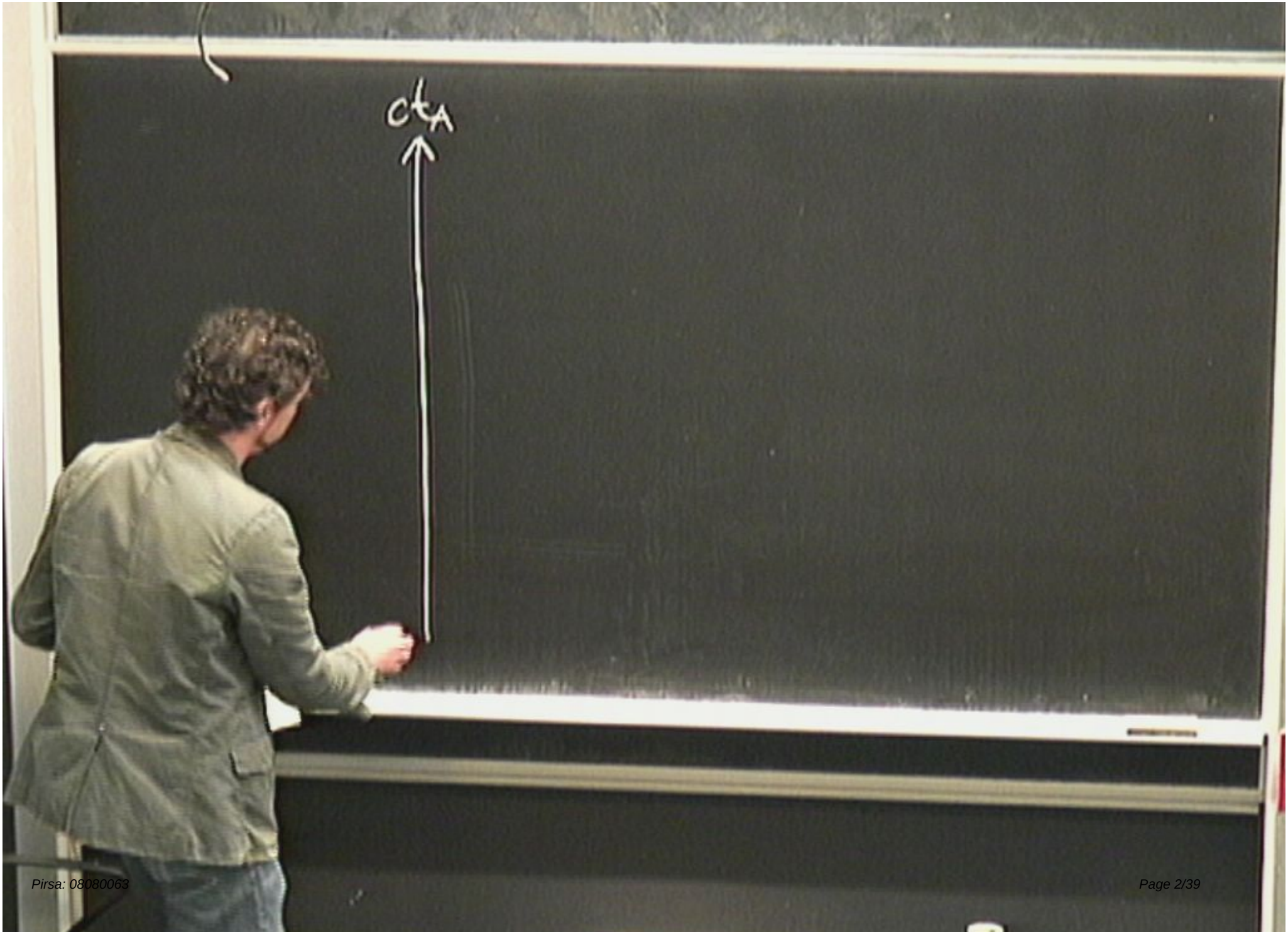
Abstract: Repeating the experiment from SR-3 using light rather than sound, and understanding what Einstein assumed regarding the speed of light.

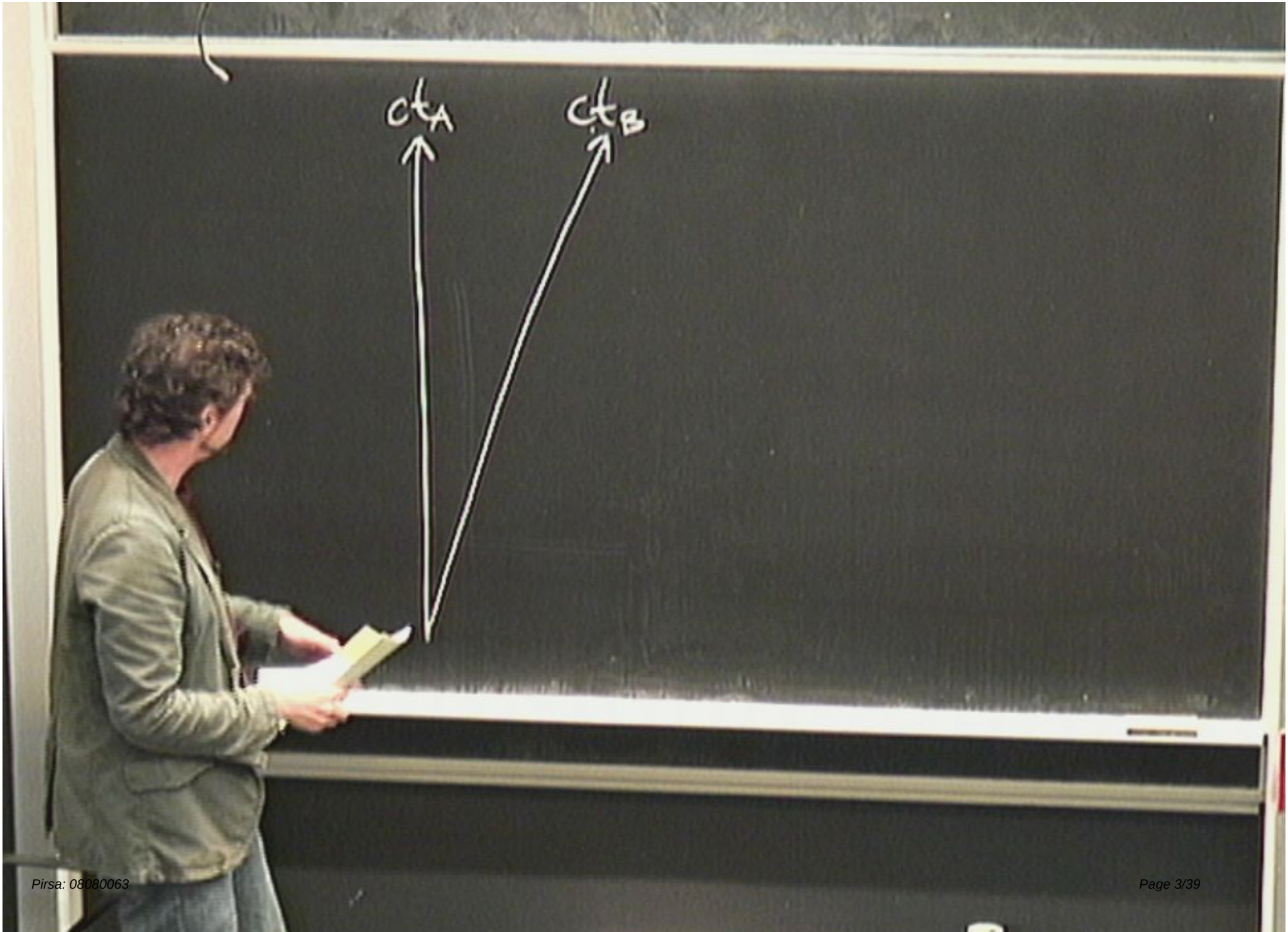
 Learning Outcomes:

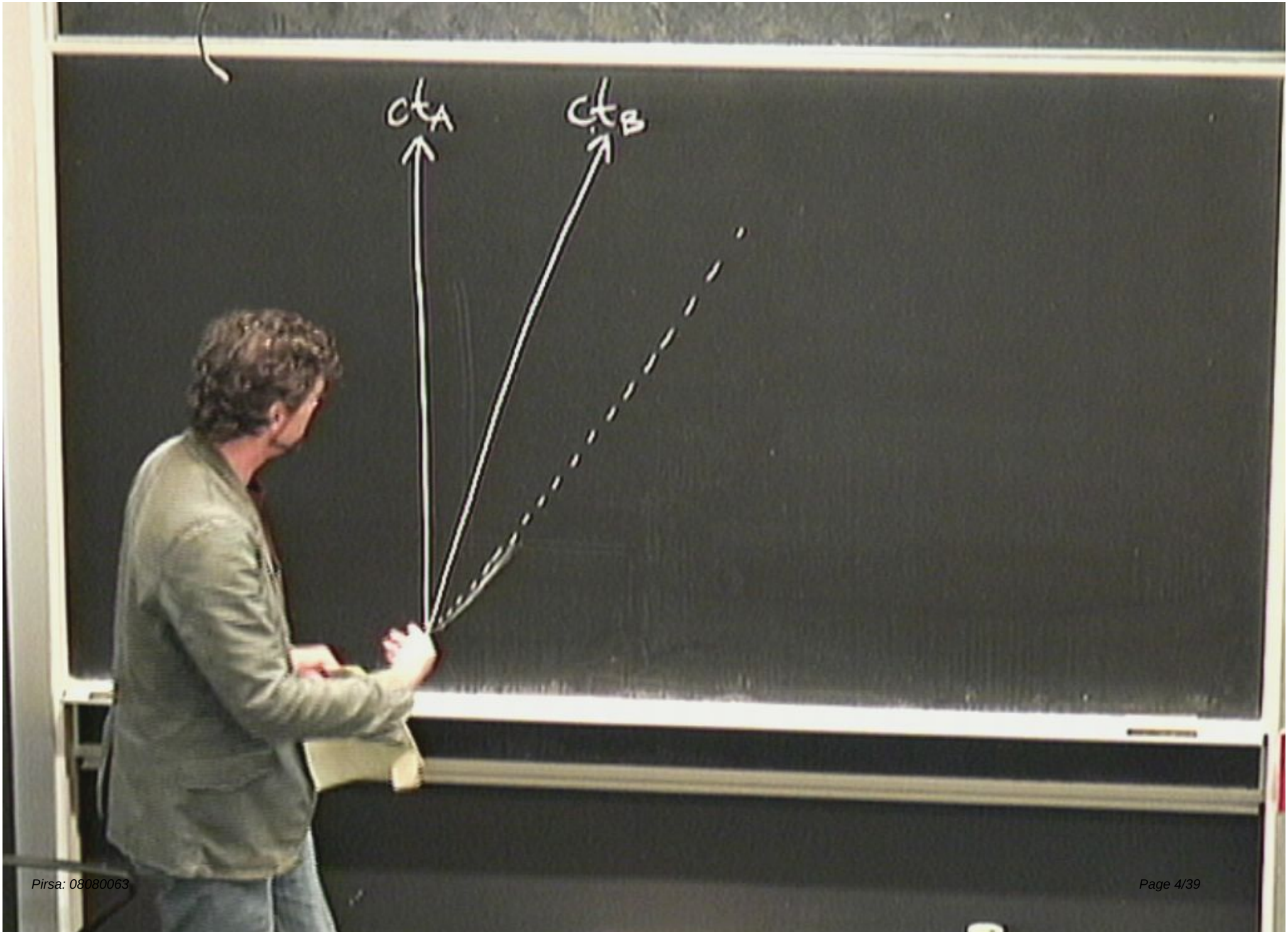
â€¢ How to draw a spacetime diagram that represents the sending and receiving of a light signal.

â€¢ Understanding that Einstein's Speed of Light Principle: "For an observer at rest, the speed of light is c, independent of the motion of the source" is natural and easy to believe.

â€¢ Interchanging the words observer and source we arrive at Principle 2*: "For a source at rest, the speed of light is c, independent of the motion of the observer," which Einstein did not assume, because it is very hard to understand how it could be true.


ct_A


ct_A
ct_B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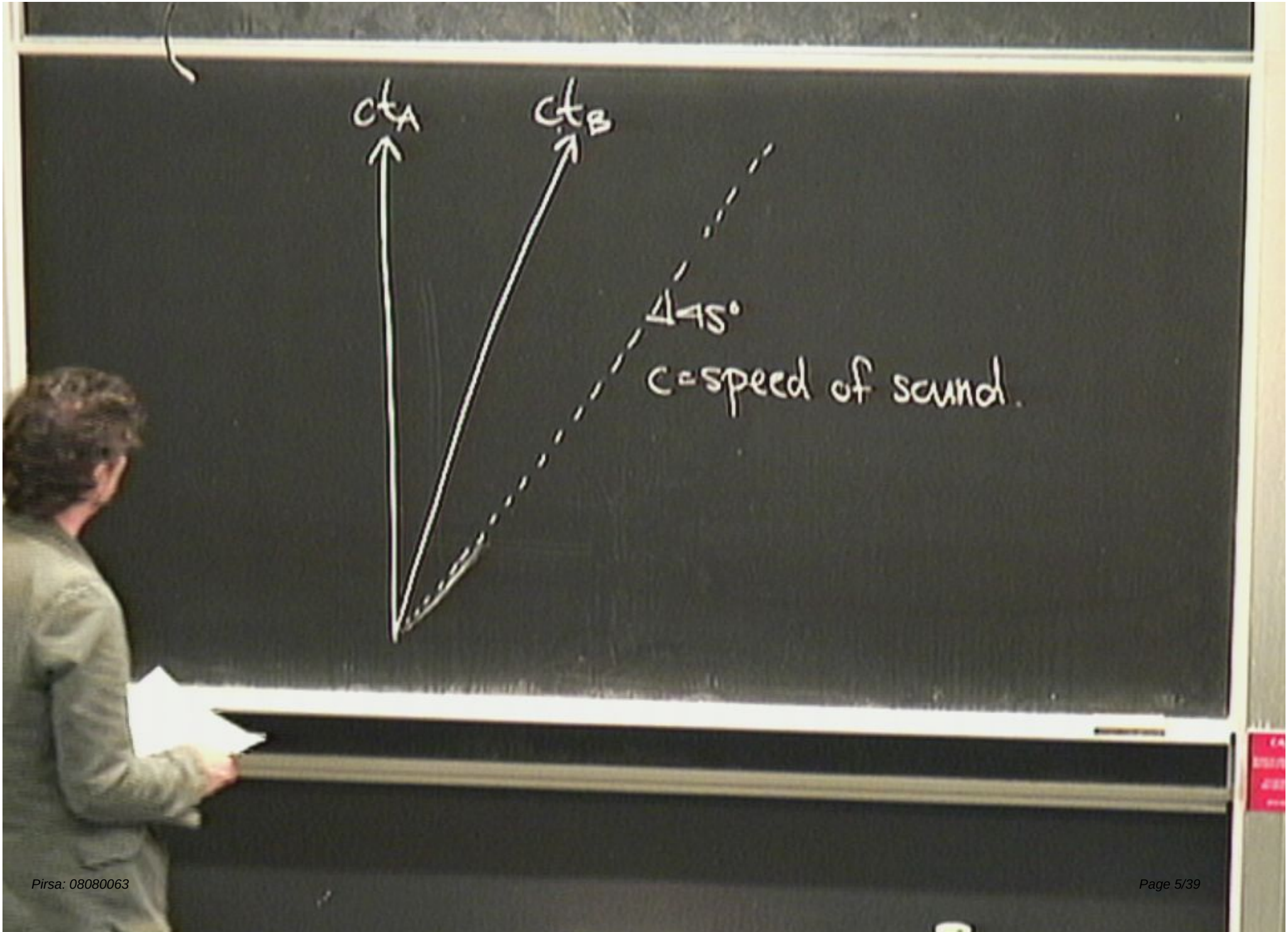
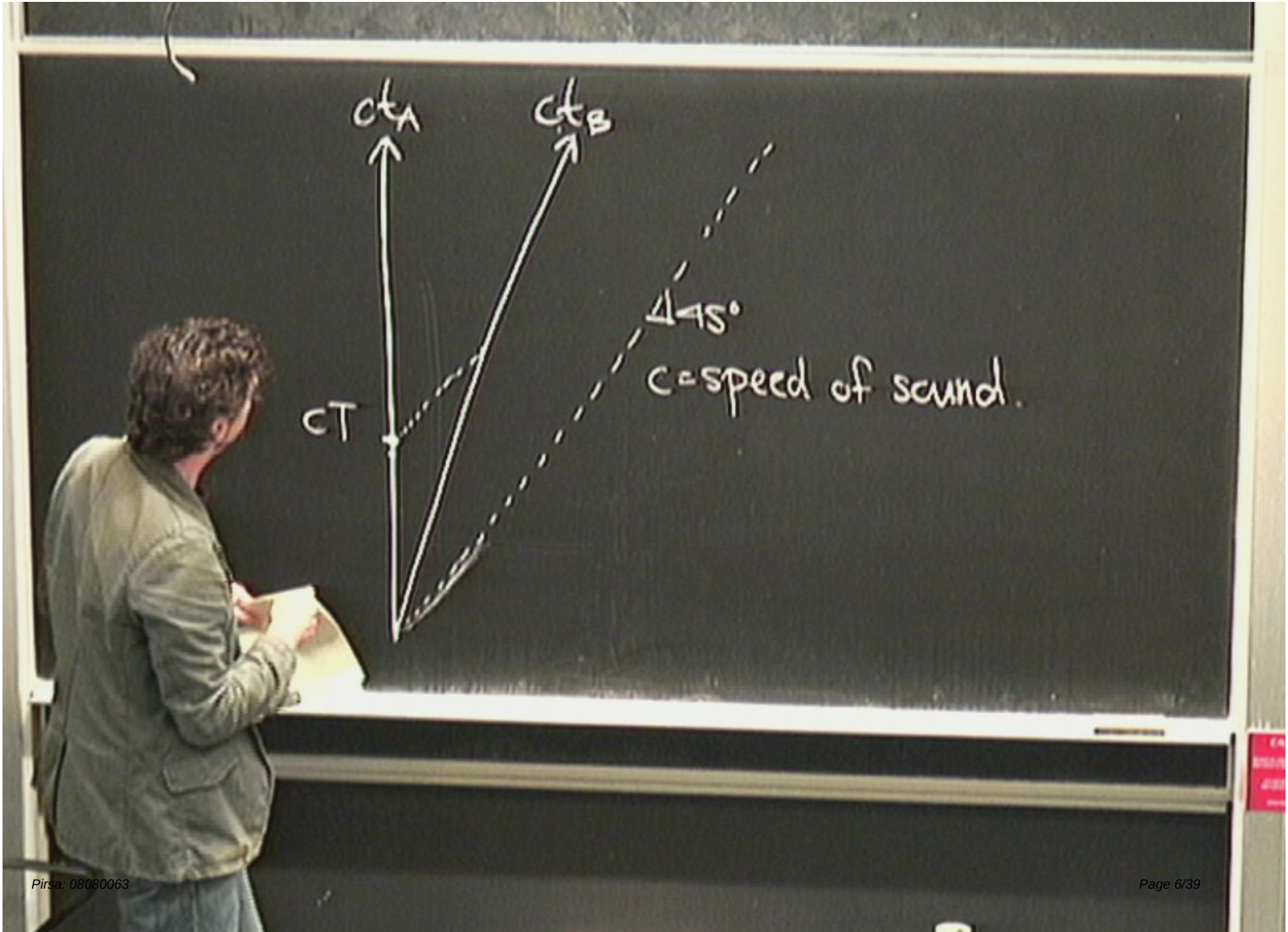
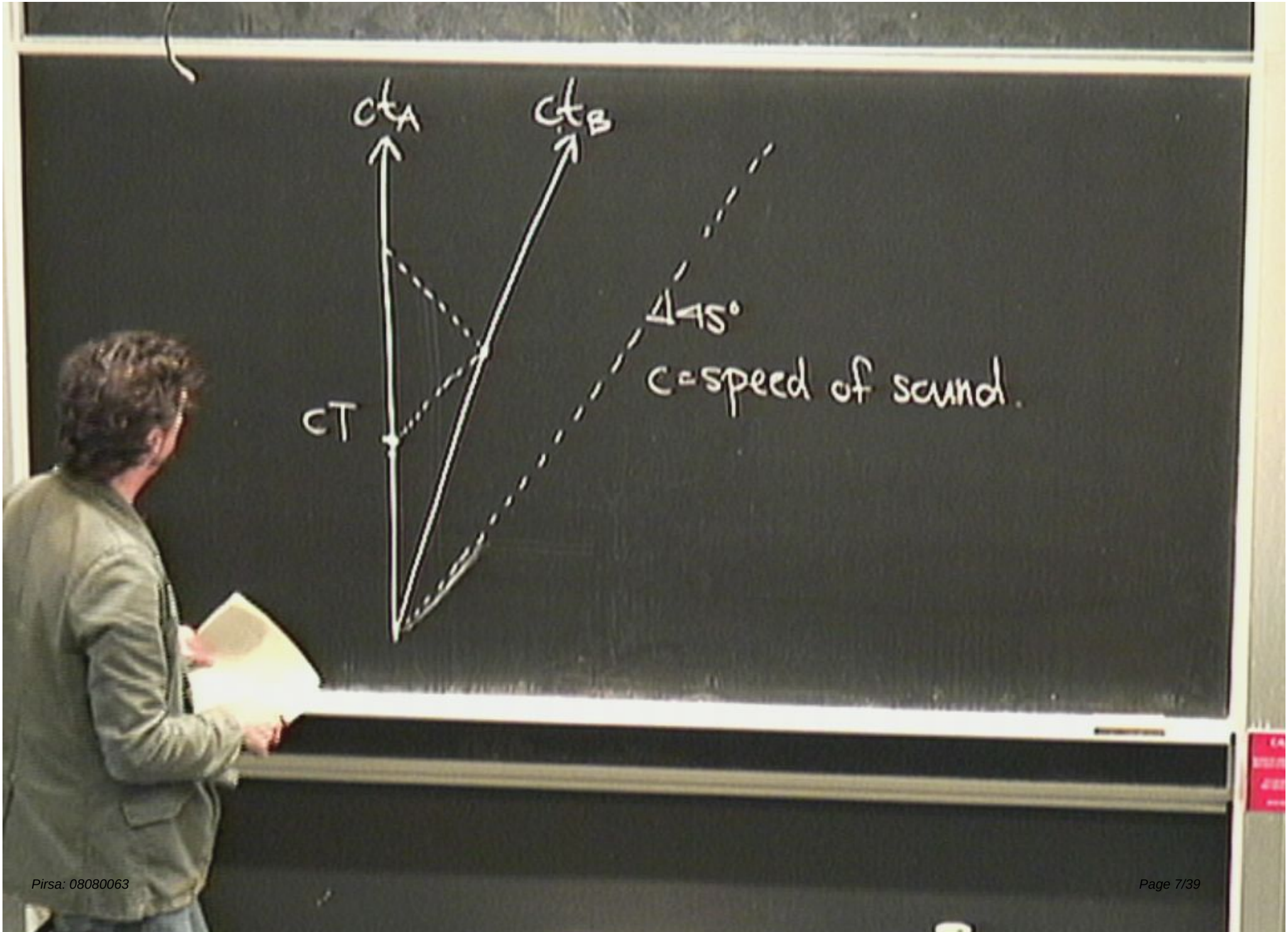
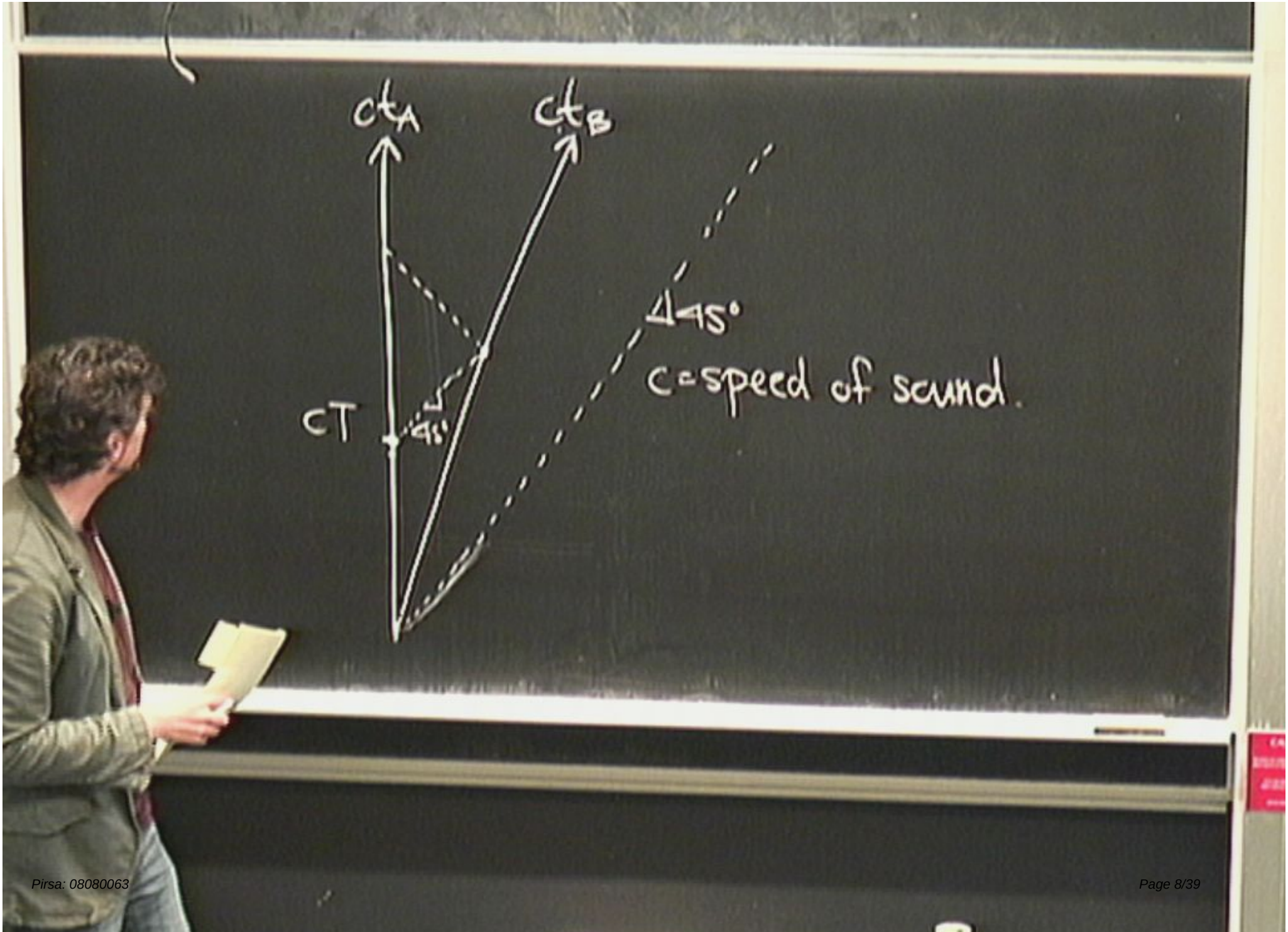
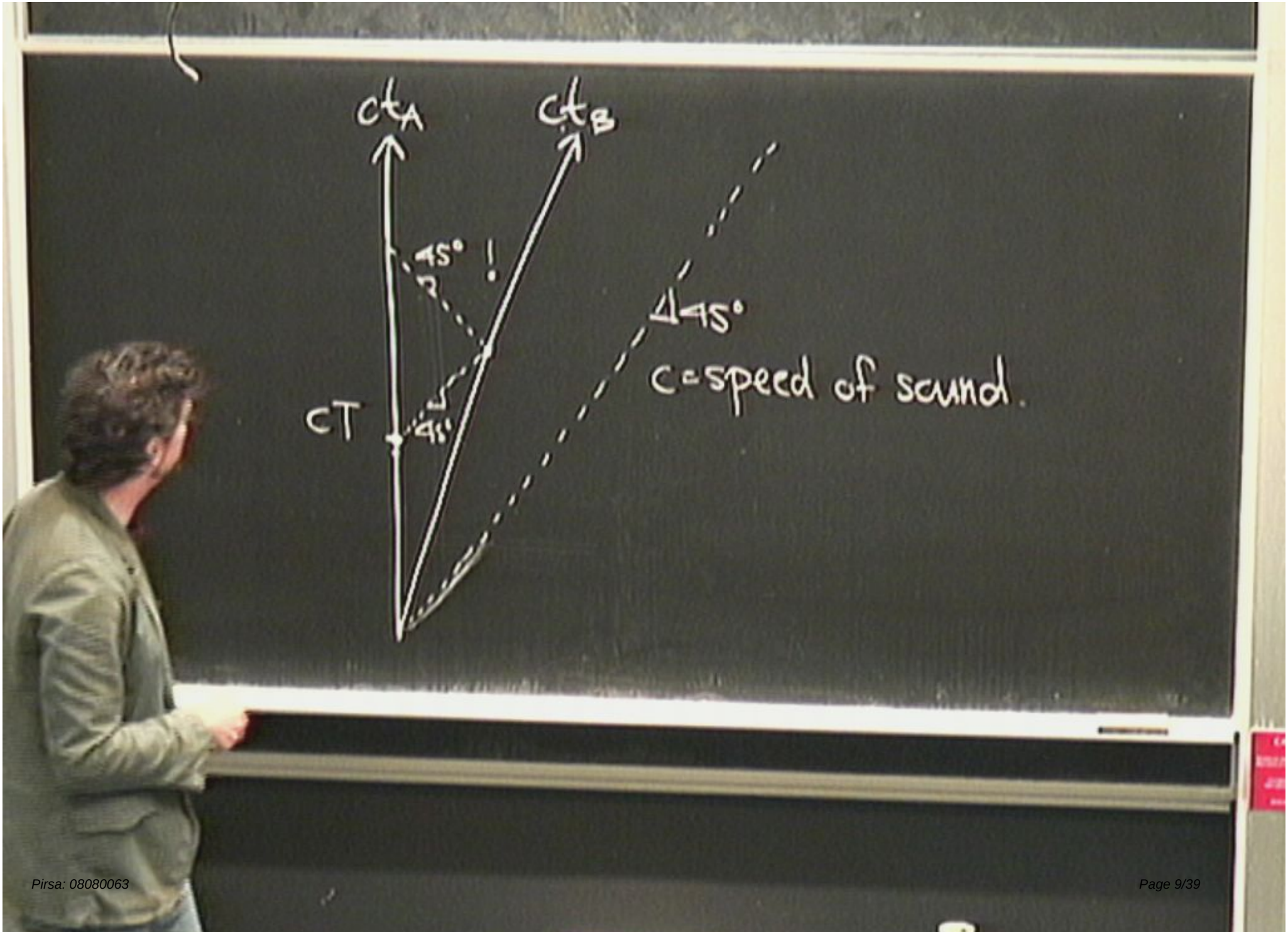
ct_B

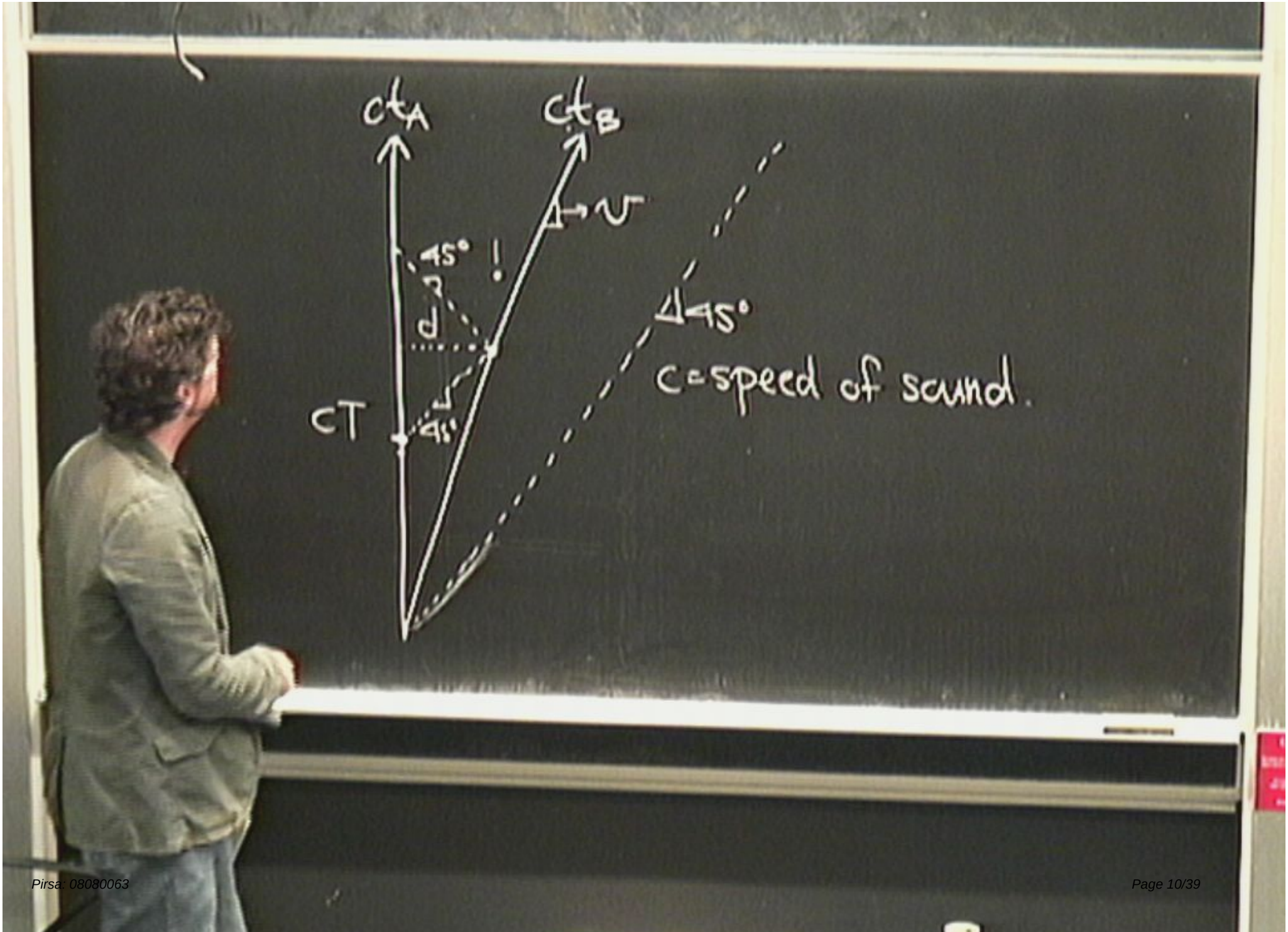

ct_A
ct_B
45°
c=speed of sound.

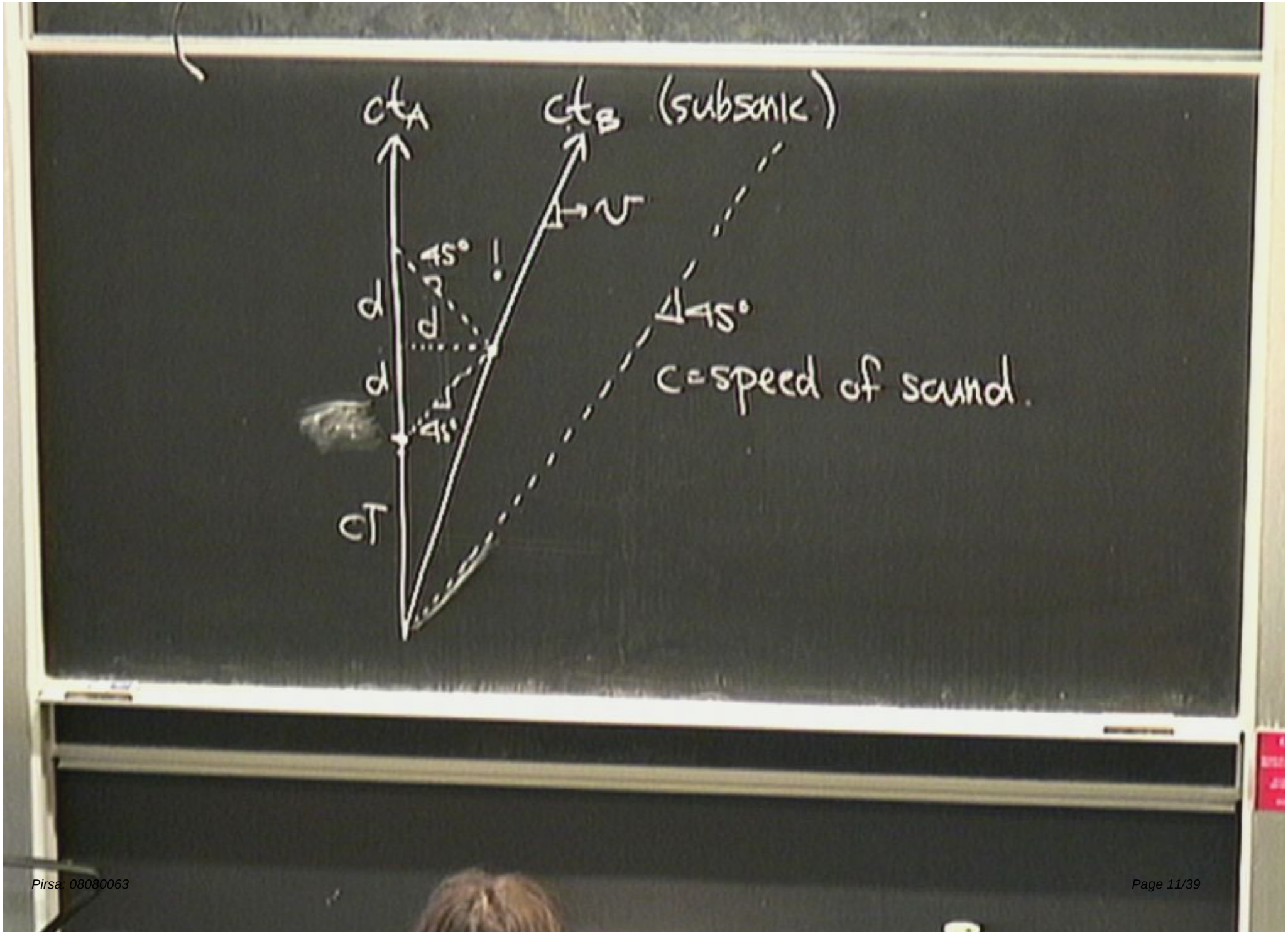

ct_A
ct_B
45°
c=speed of sound.
CT

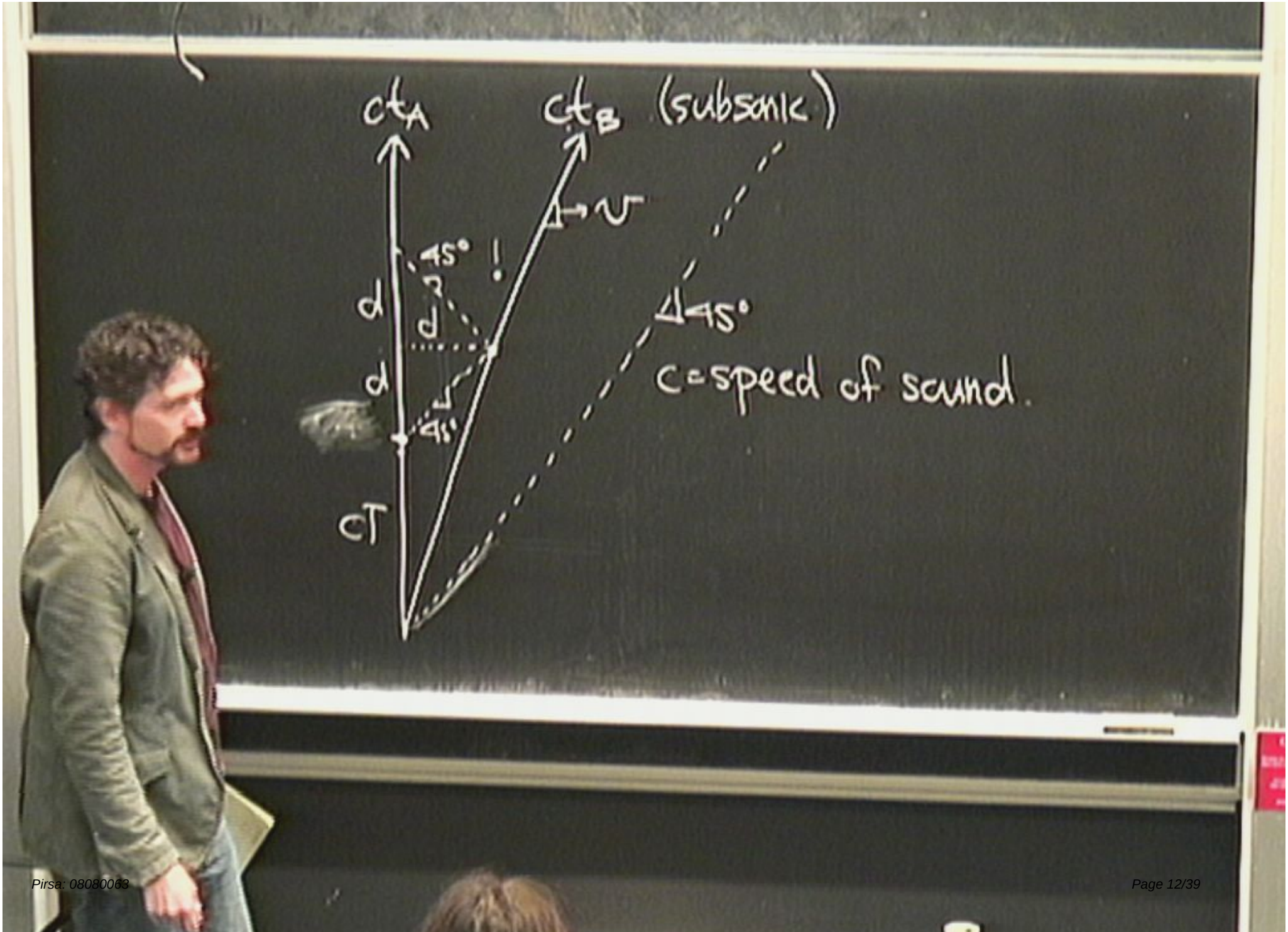

ct_A
ct_B
CT
45°
c=speed of sound.

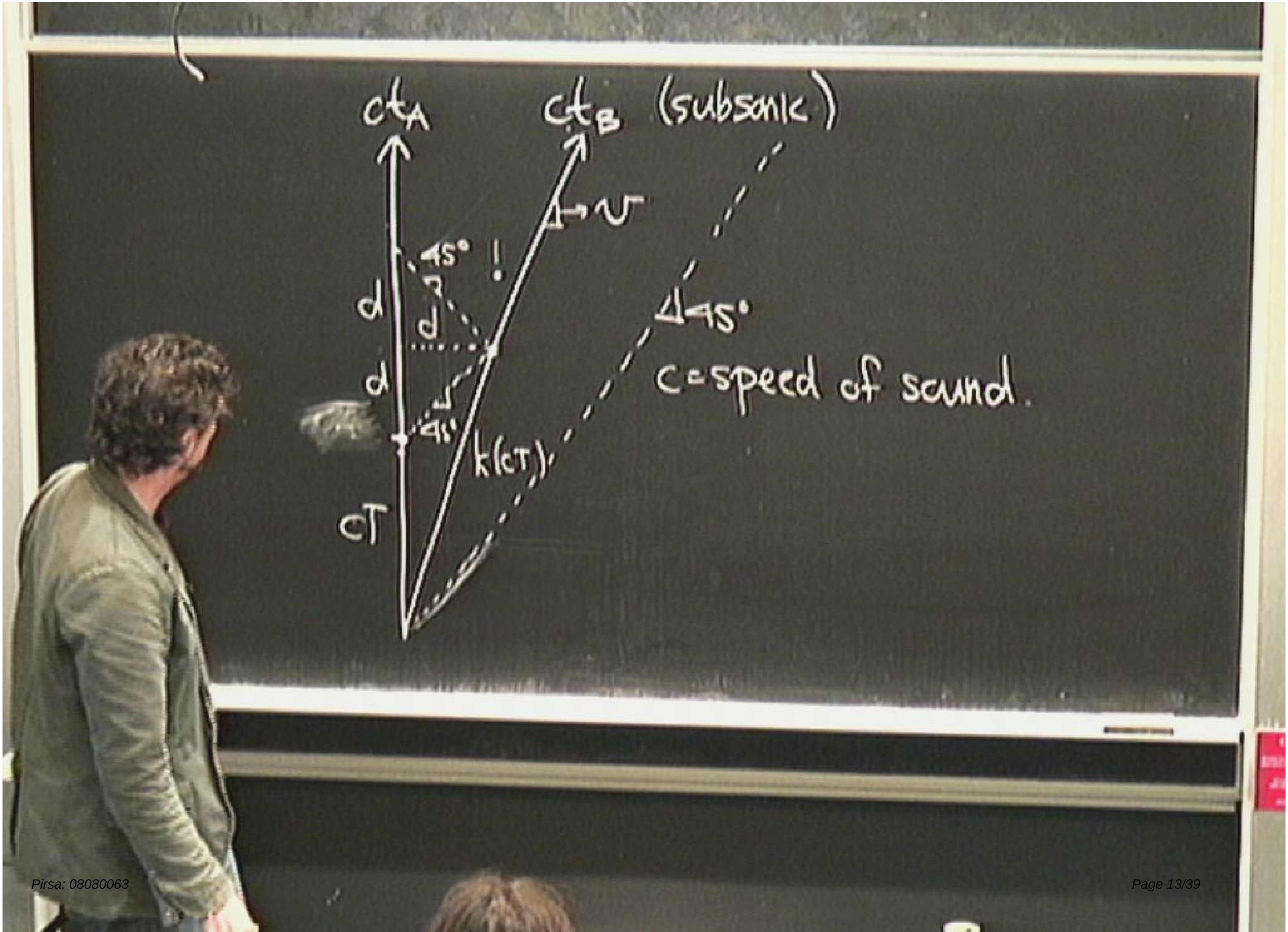

ct_A
ct_B
$\angle 45°$
c = speed of sound.
CT
45°

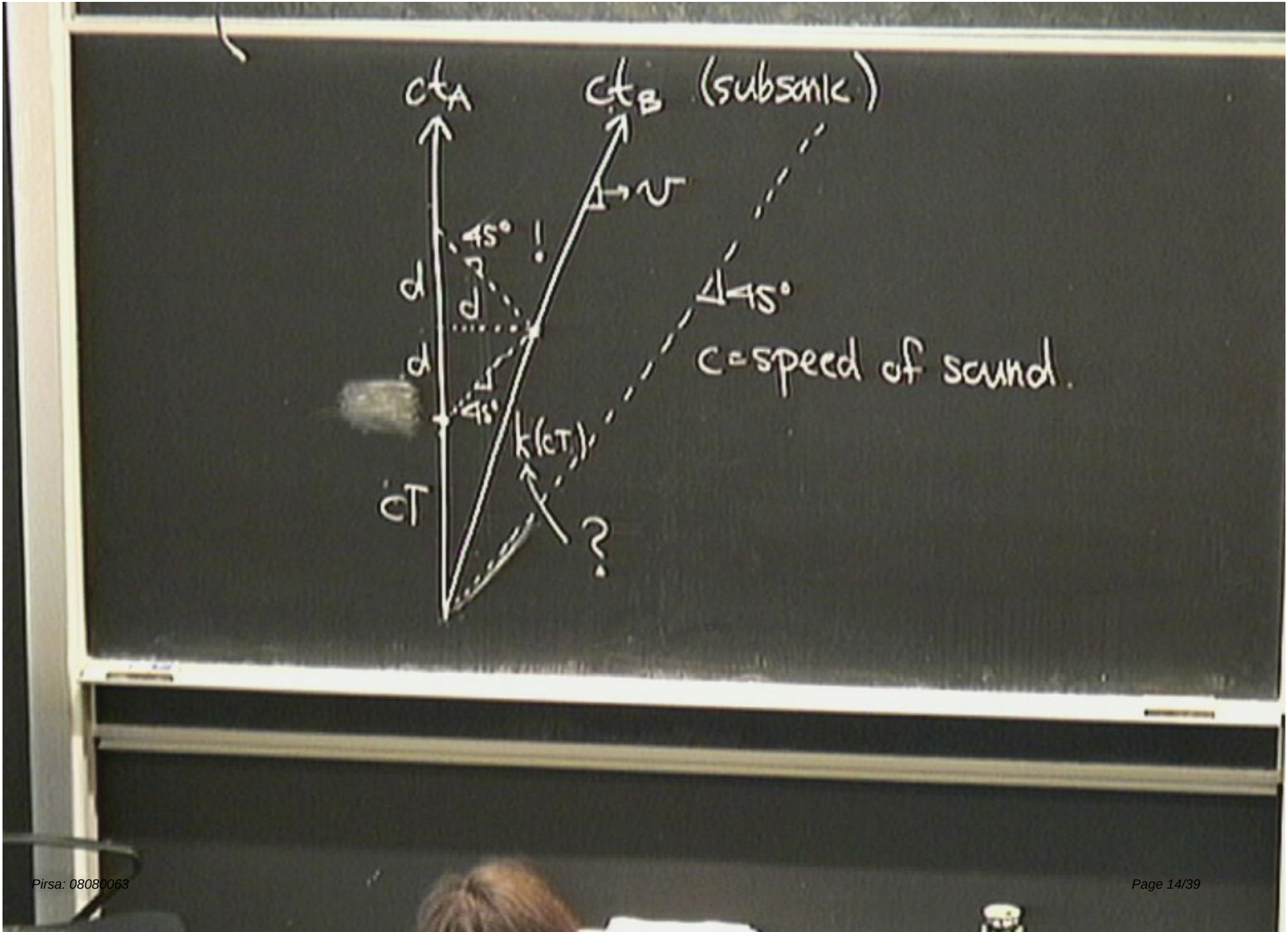

ctA
ctB
45°
!
CT
45°
c=speed of sound.

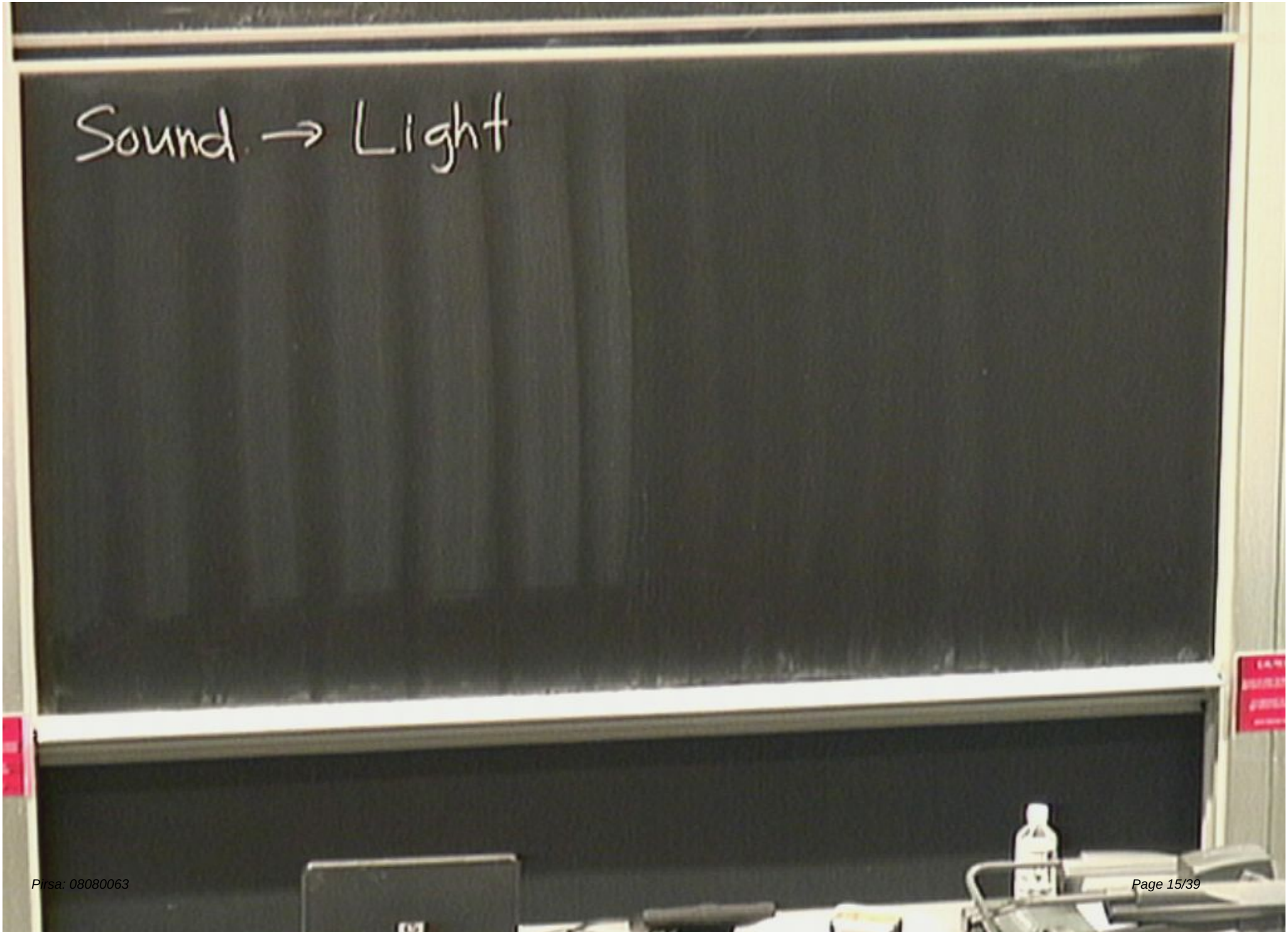

ct_A
ct_B
v
45°
!
d
CT
45°
45°
c=speed of sound.

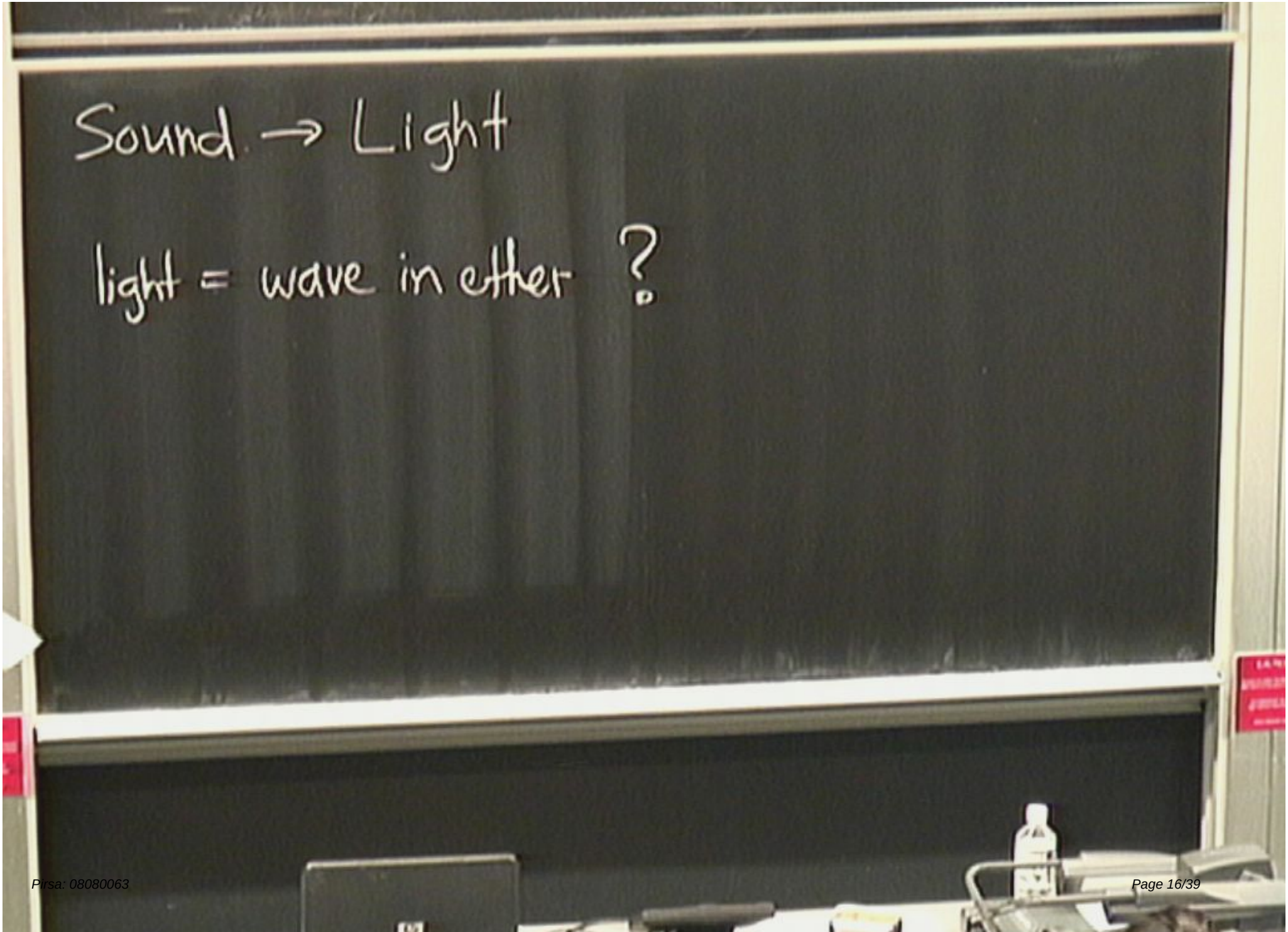

ct_A
ct_B (subsonic)
v
45°
!
d
d
d
45°
45°
cT
c=speed of sound.

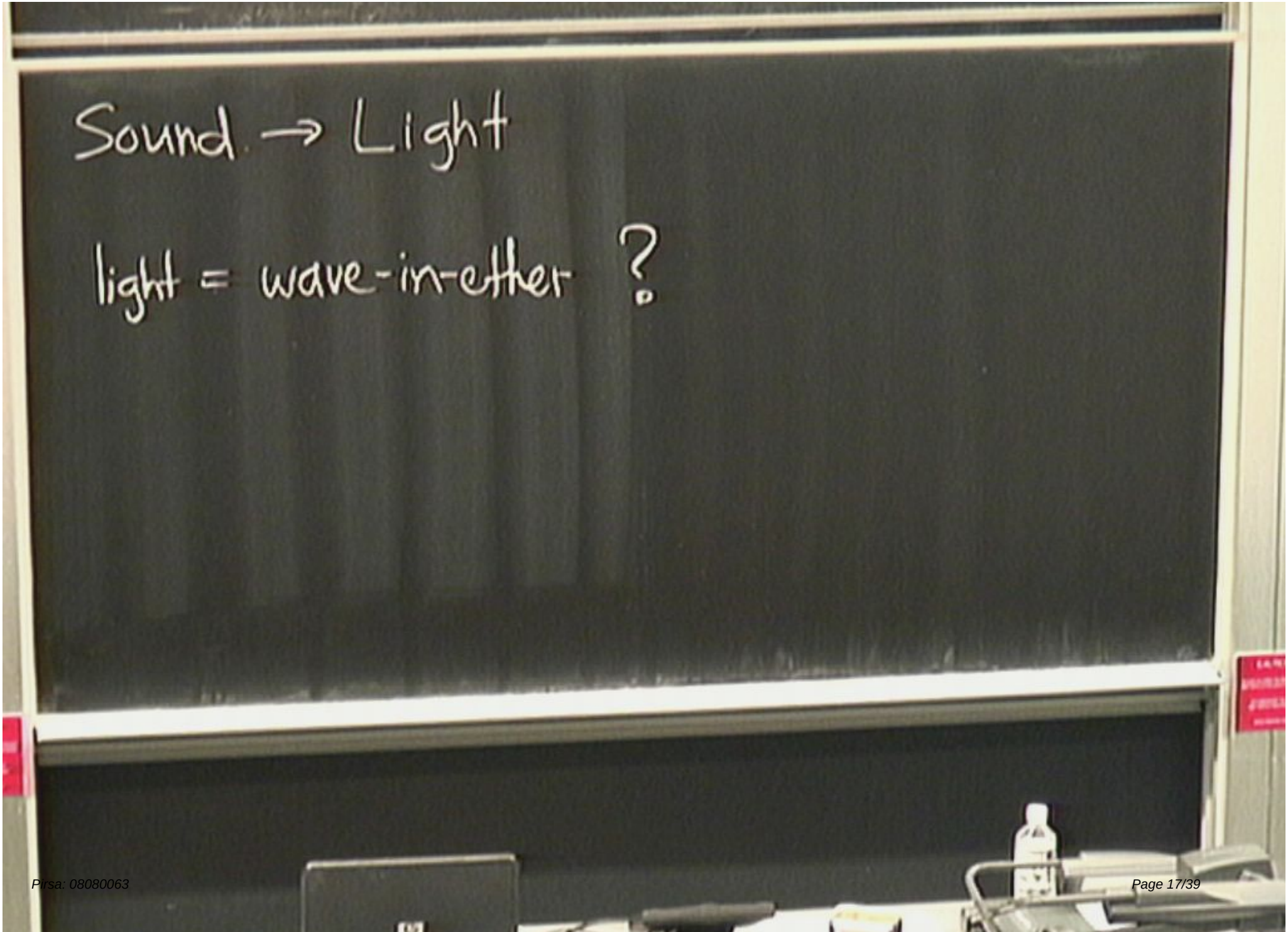

ct_A
ct_B (subsonic)
v
45°
!
d
d
d
45°
$\angle$ 45°
c = speed of sound.
CT


ct_A
ct_B (subsonic)
v
45°
!
d
d
d
45°
45°
c=speed of sound.
k(cT)
cT


ct_A
ct_B (subsonic)
v
45°
!
d
d
d
45°
45°
c=speed of sound.
$k(cT)$
cT
?


Sound → Light


Sound → Light
light = wave in ether ?


Sound → Light
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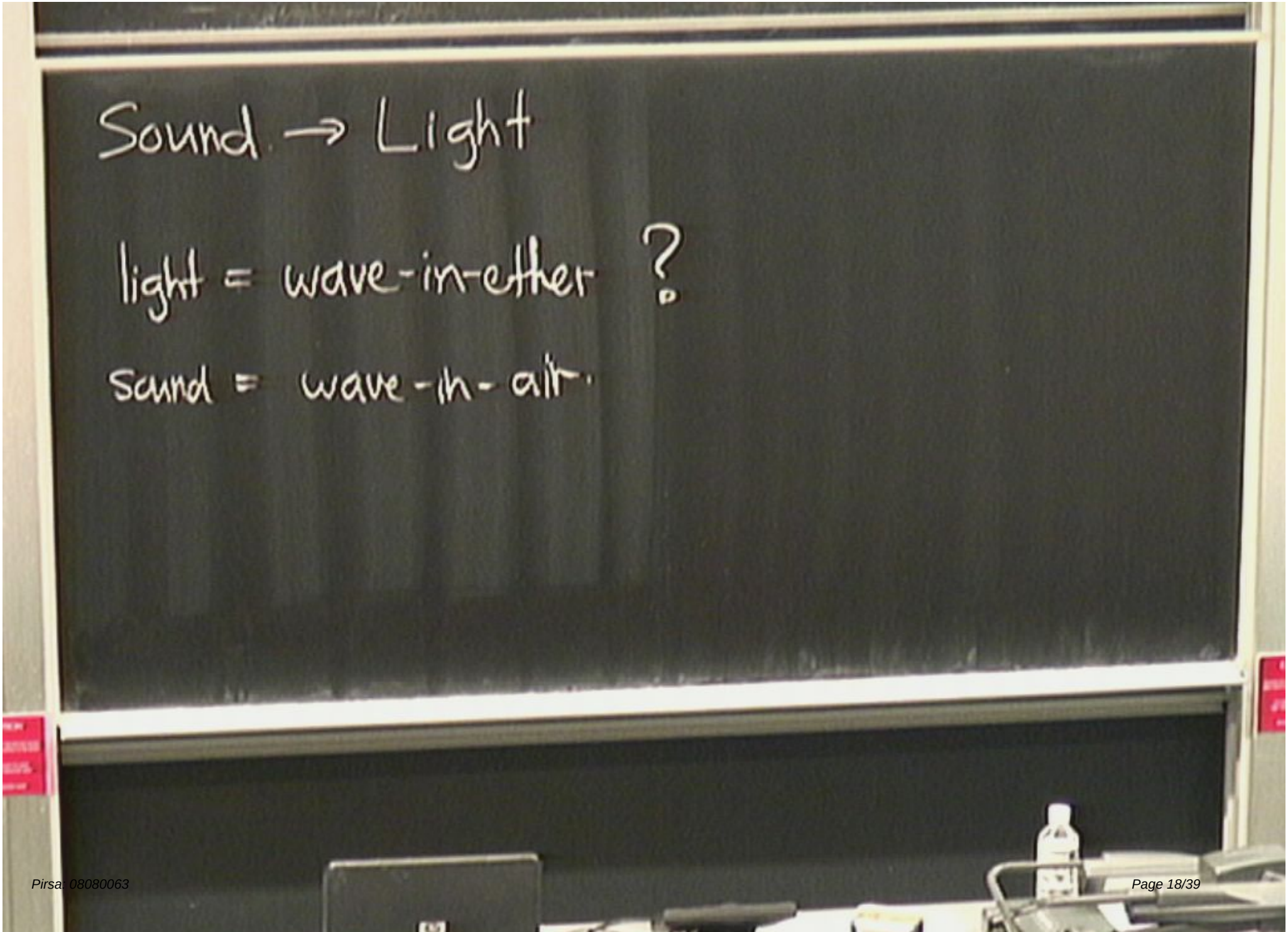
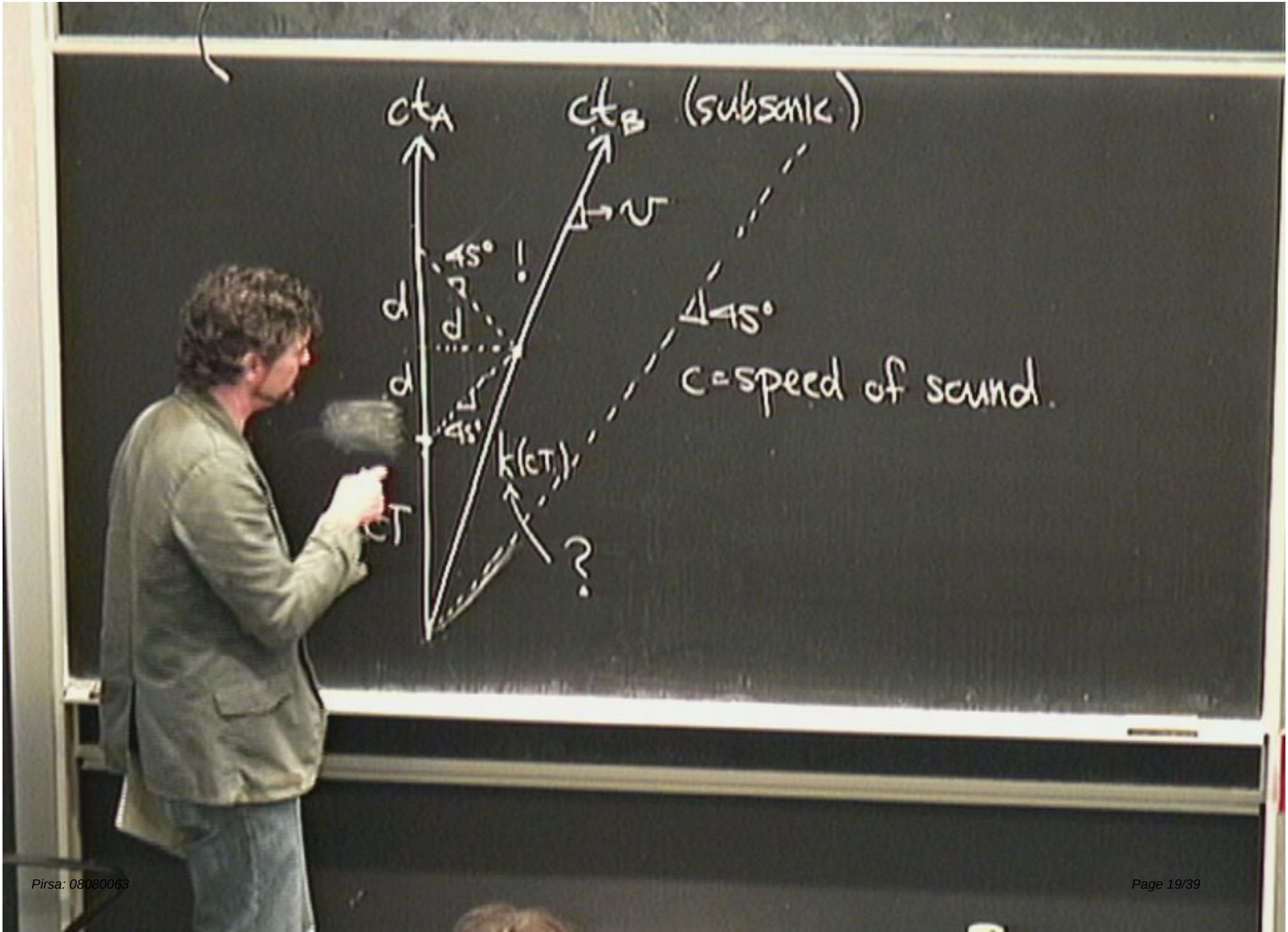
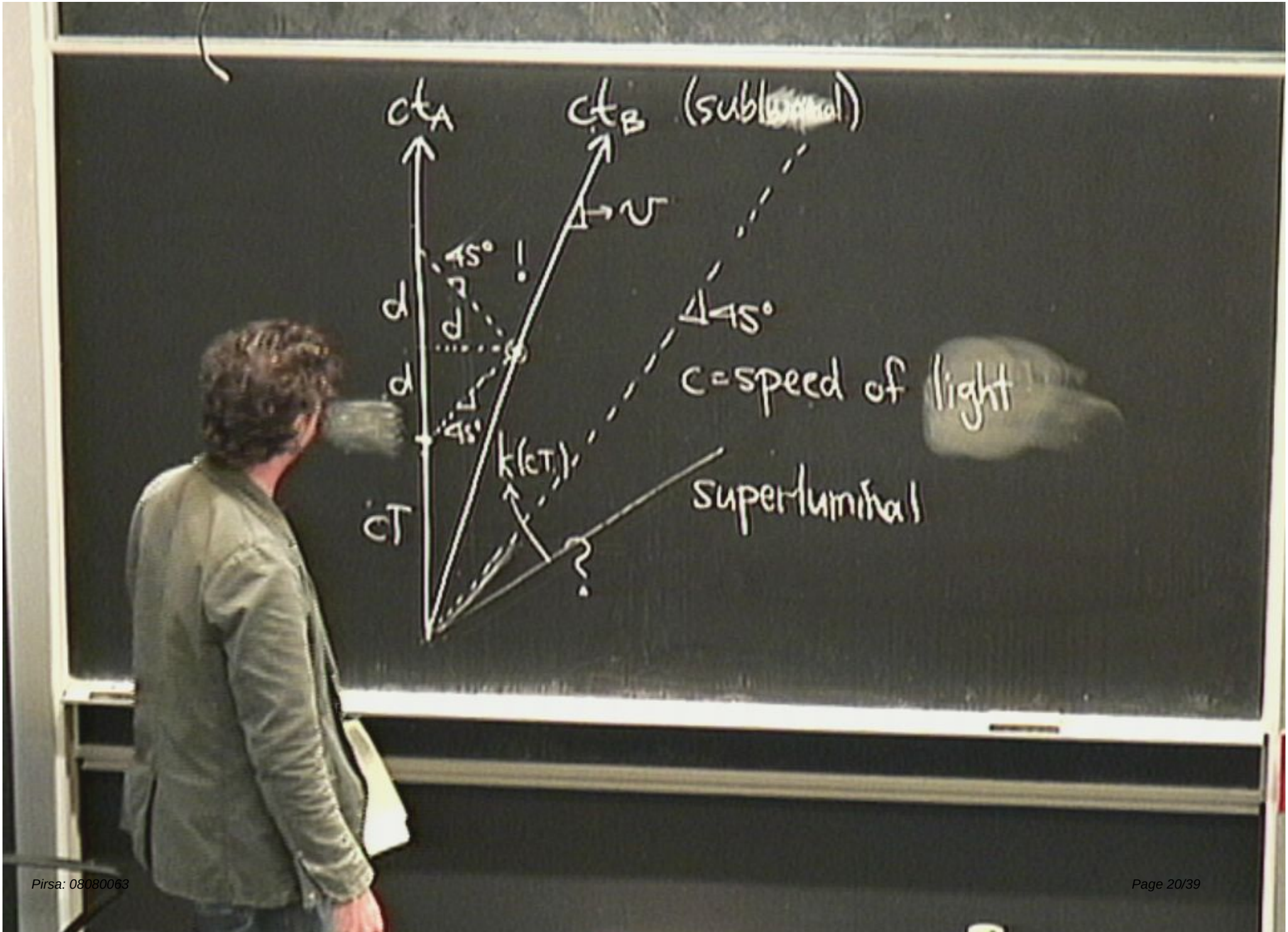
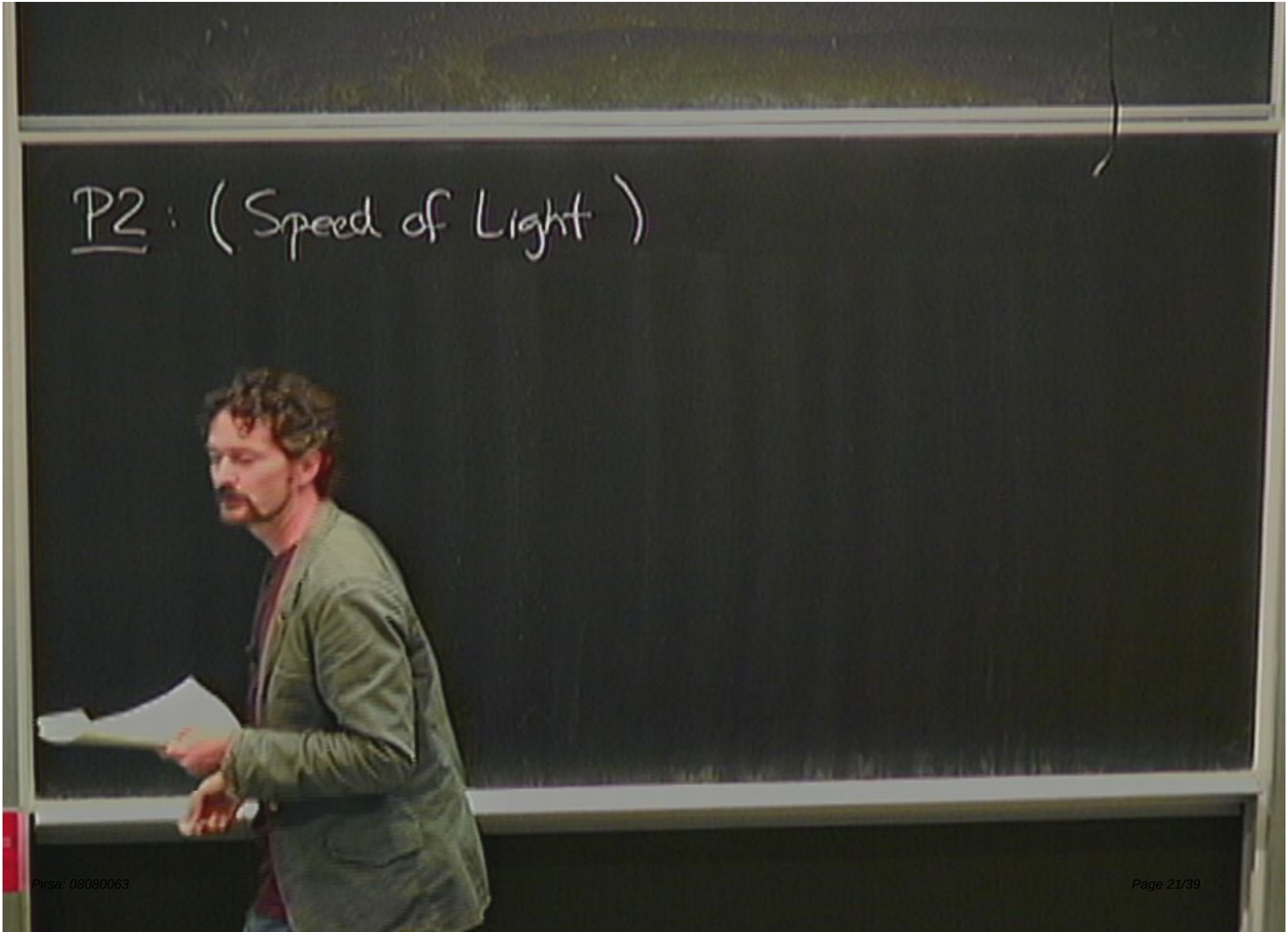

Sound → Light
light = wave-in-ether ?
sound = wave-in-air


ct_A
ct_B (subsonic)
v
45°
!
d
d
d
45°
45°
c=speed of sound.
k(cT)
cT
?


ct_A
ct_B
(subl
v
45°
d
d
d
45°
c=speed of light
k(cT)
cT
superluminal
?


P2 : (Speed of Light)

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For an observer "at rest", the speed of light is c, independent of the motion of the source

P2: (Speed of Light)

there exists at least one frame in which this is true.

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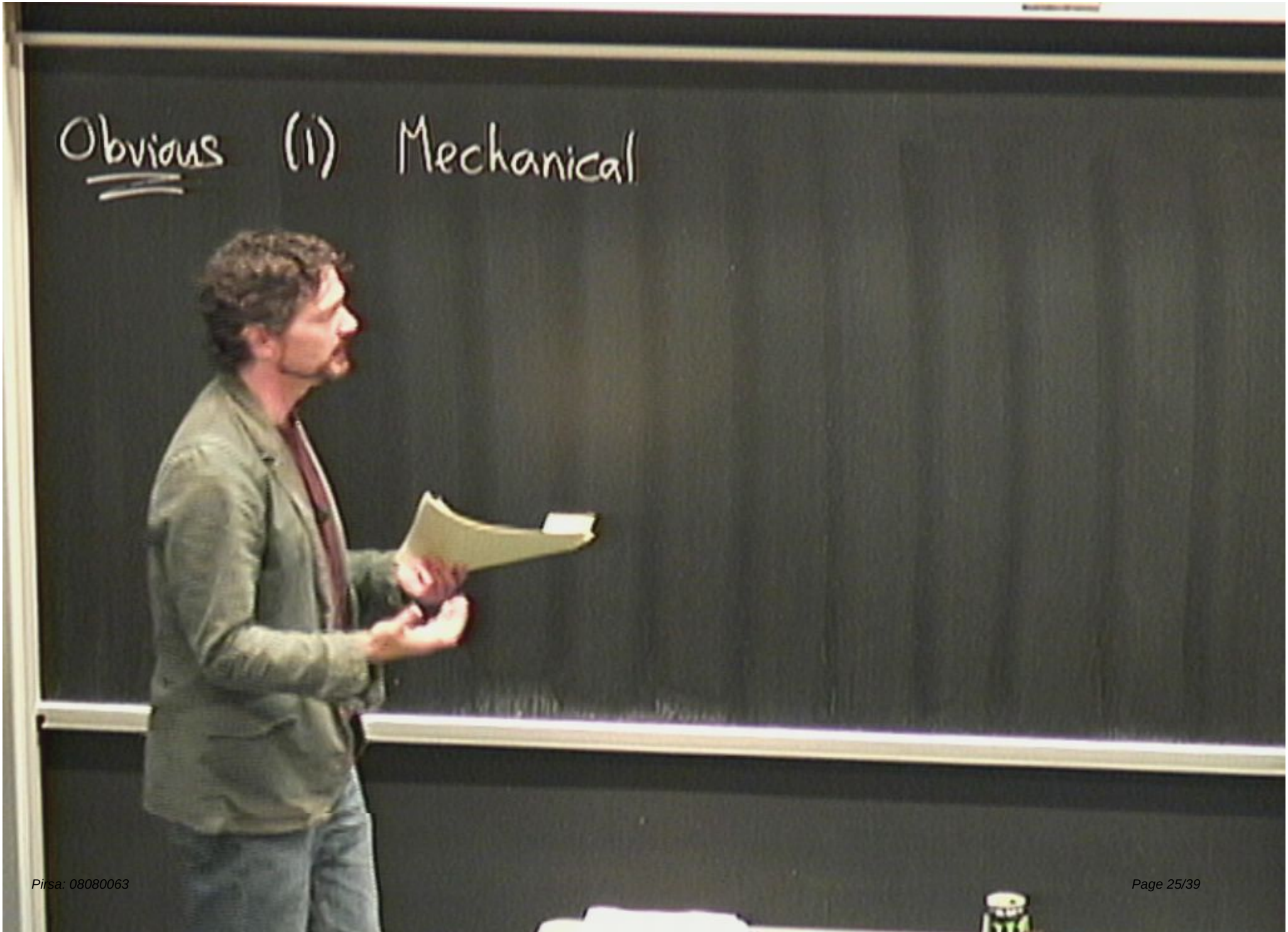
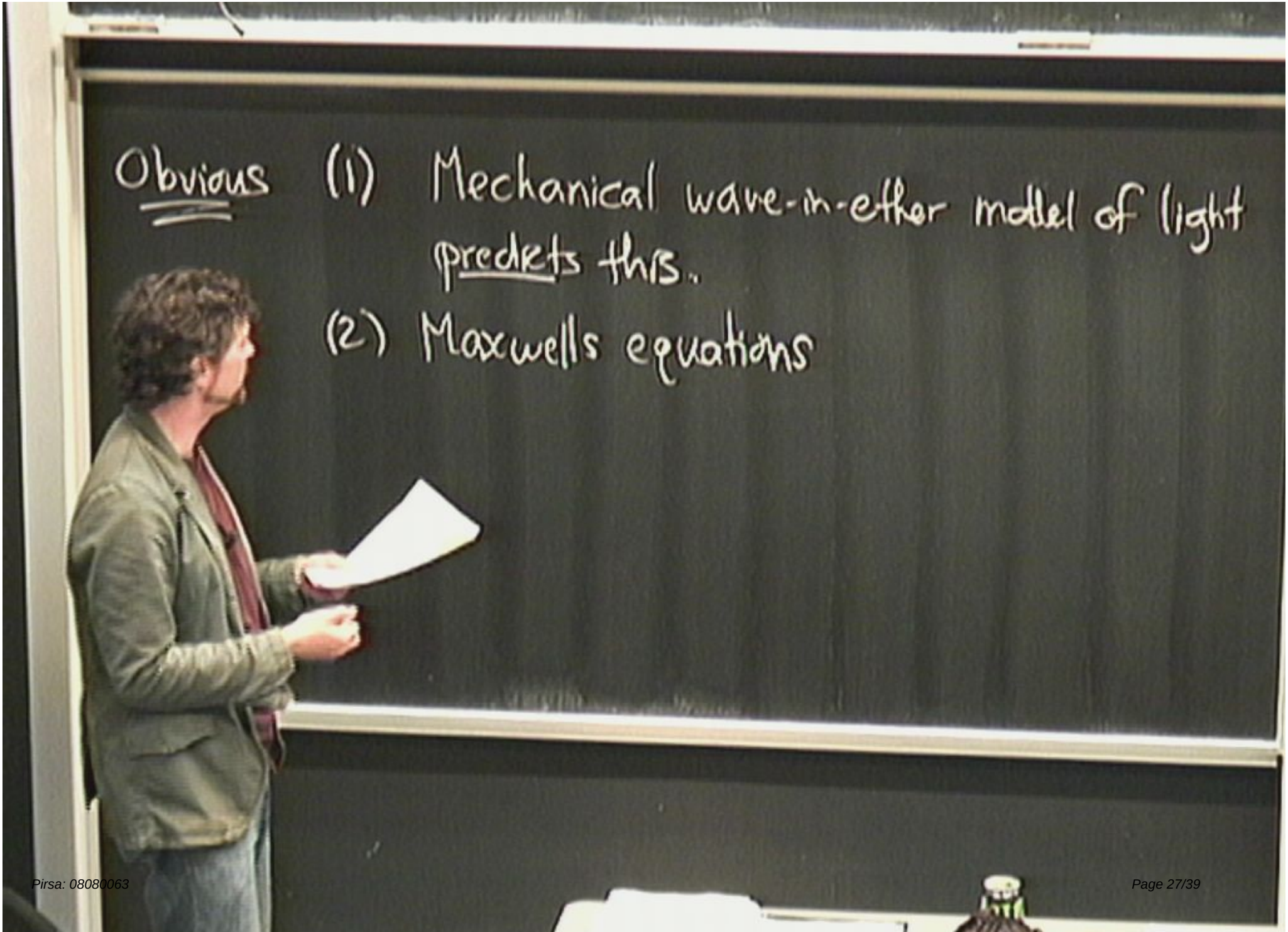

Obvious (1) Mechanical

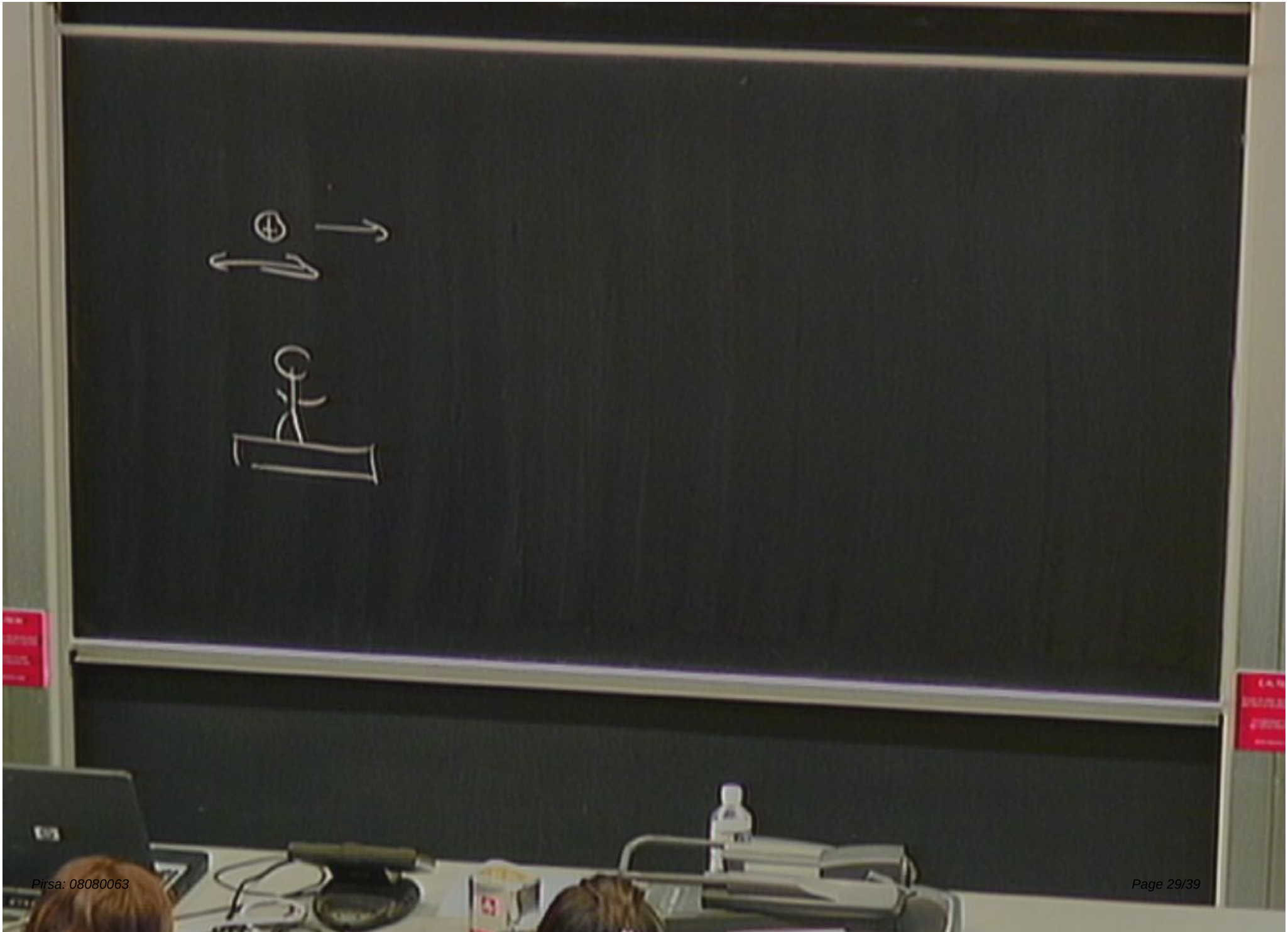
Obvious (1) Mechanical wave-in-ether model of light predicts this.

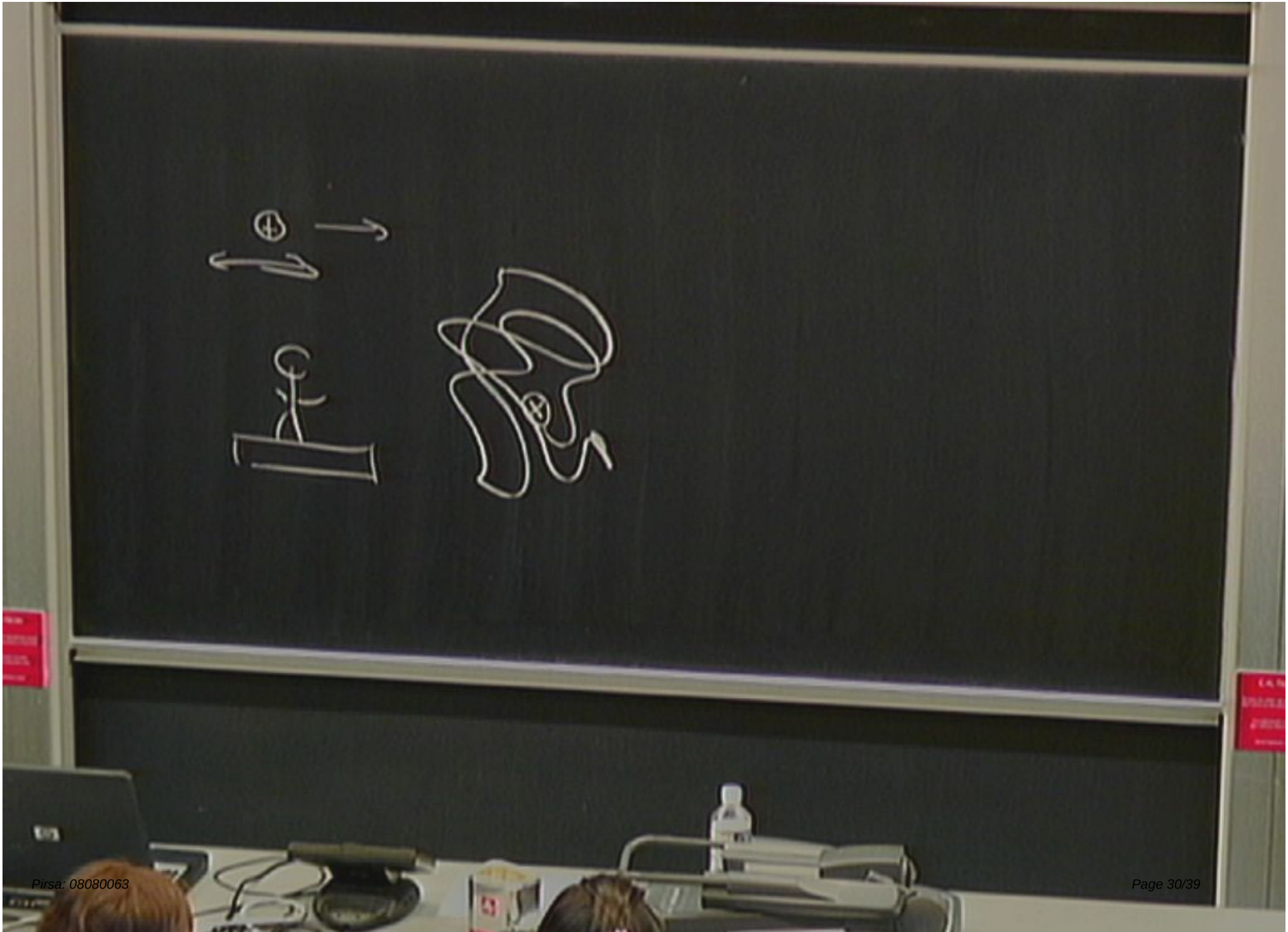
(2)

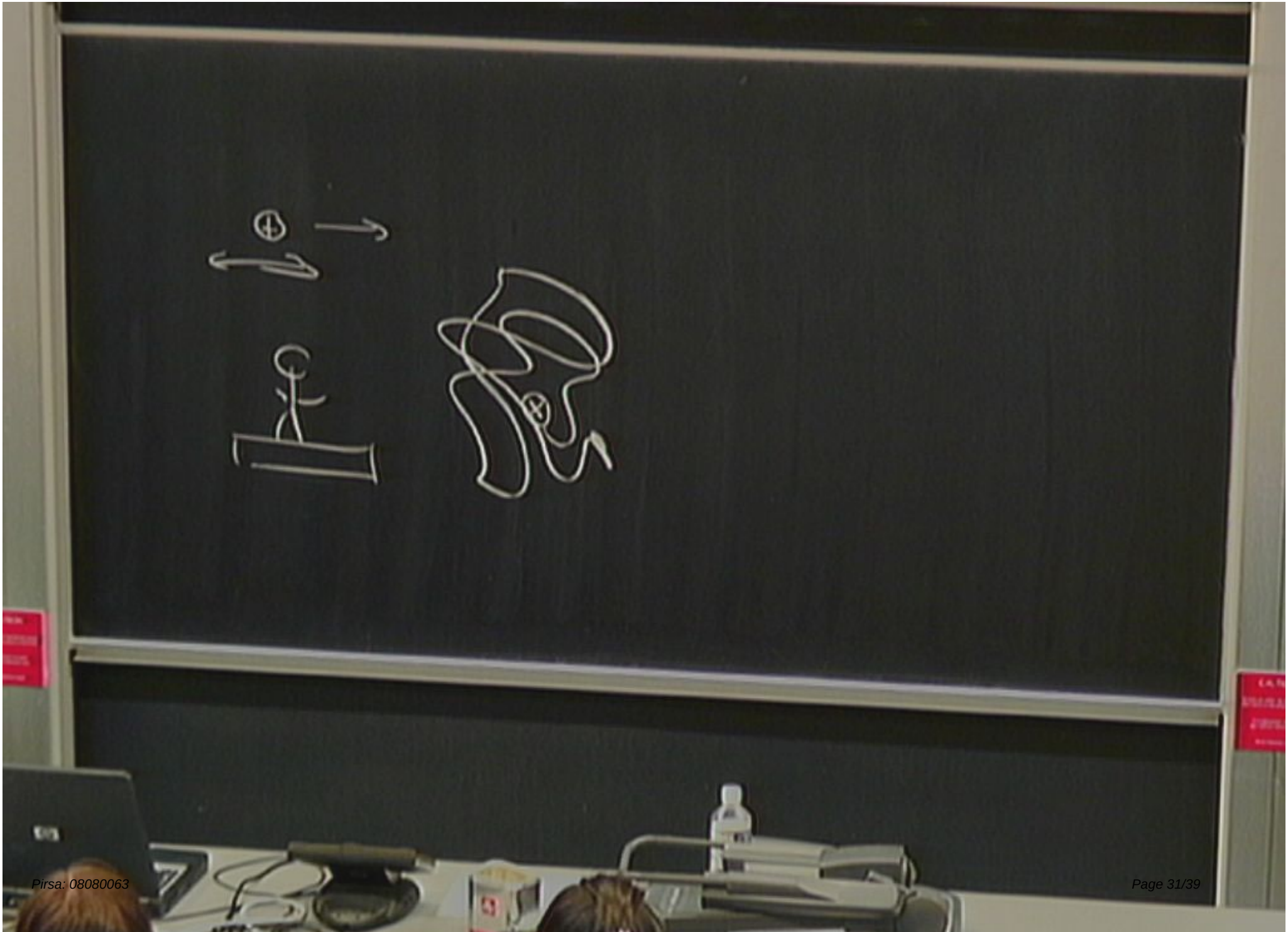

Obvious (1) Mechanical wave-in-ether model of light predicts this.
(2) Maxwells equations

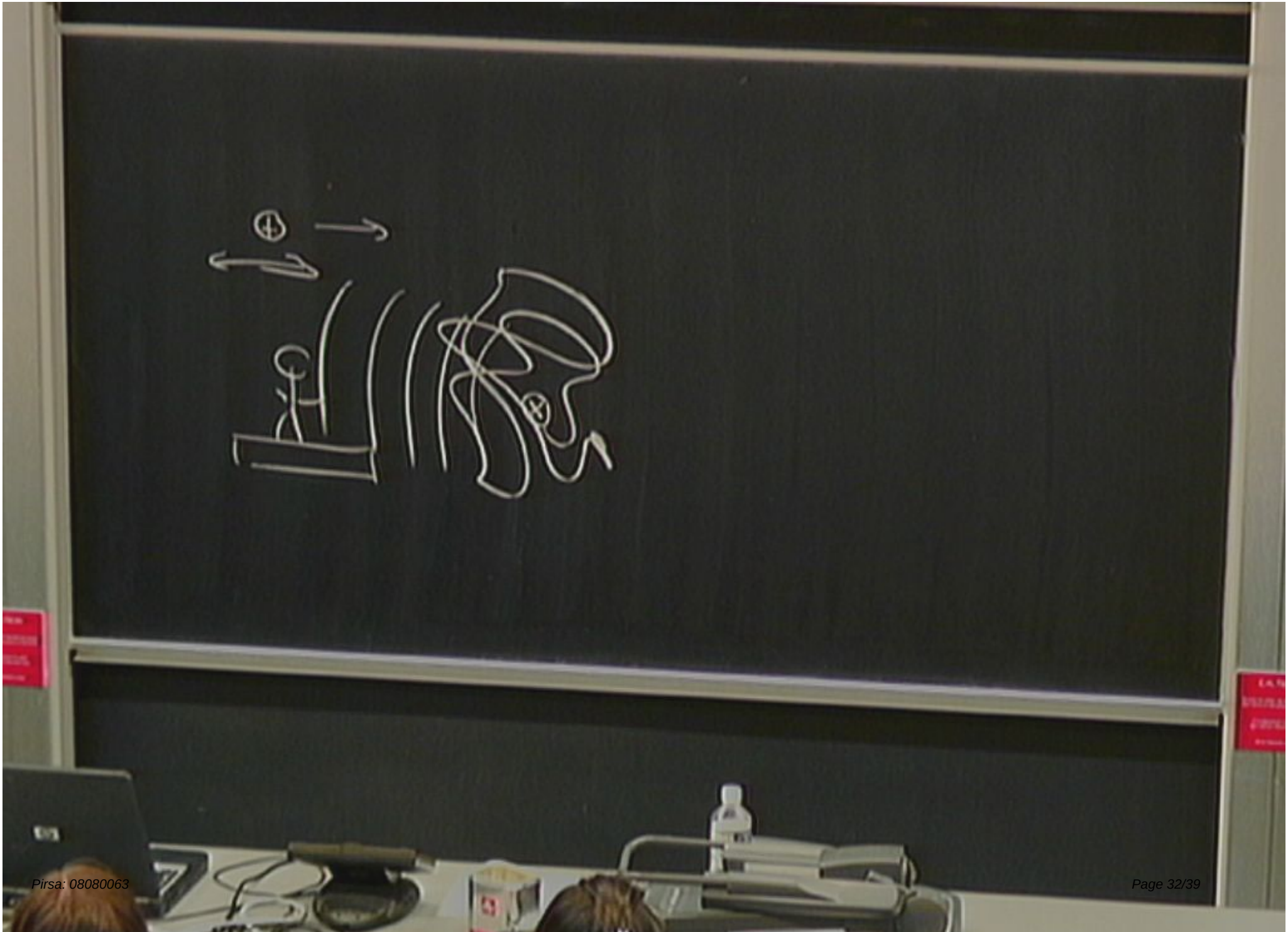
Obvious (1) Mechanical wave-in-ether model of light predicts thrs.

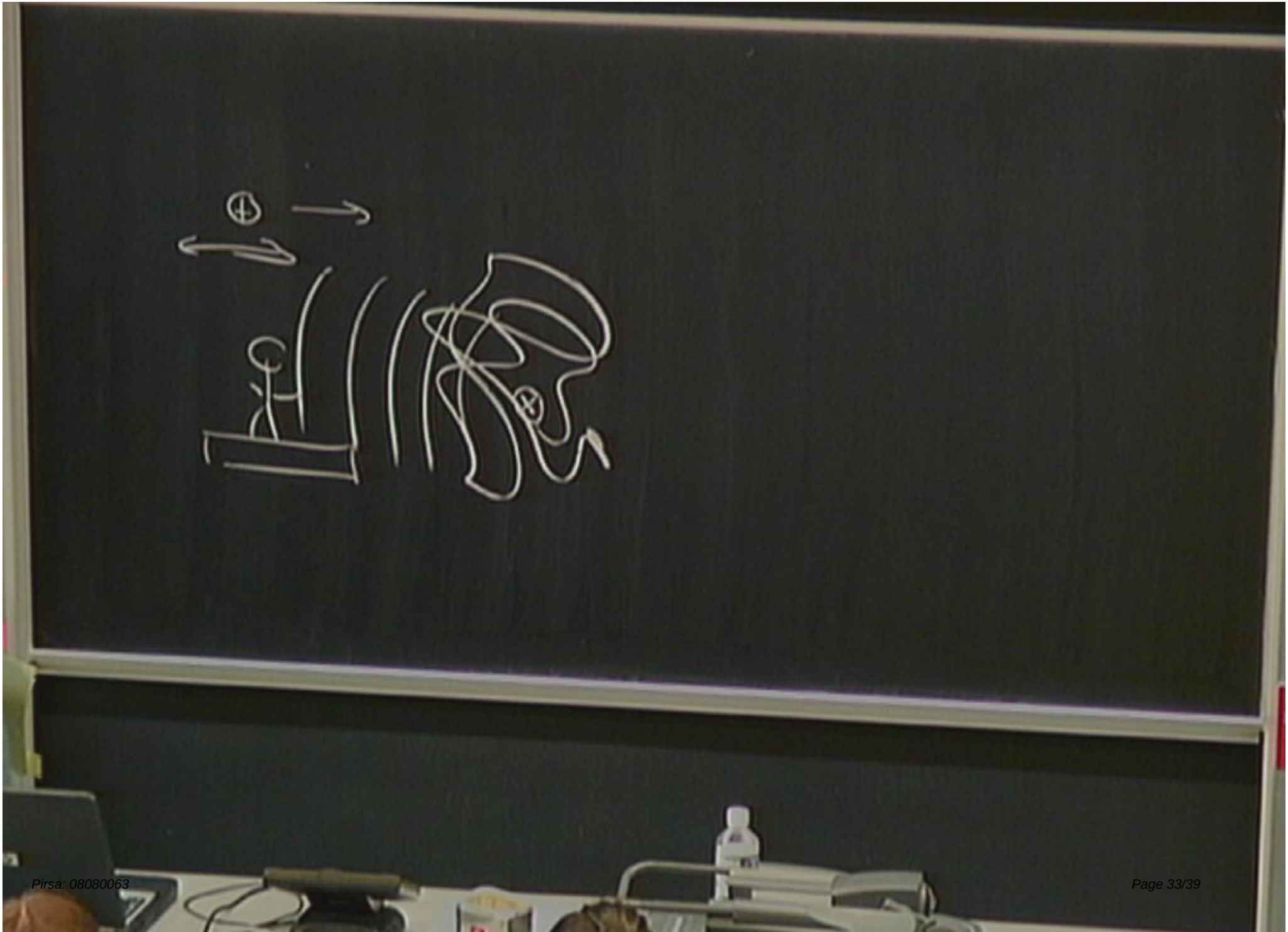
(2) Maxwells equations predict thr?

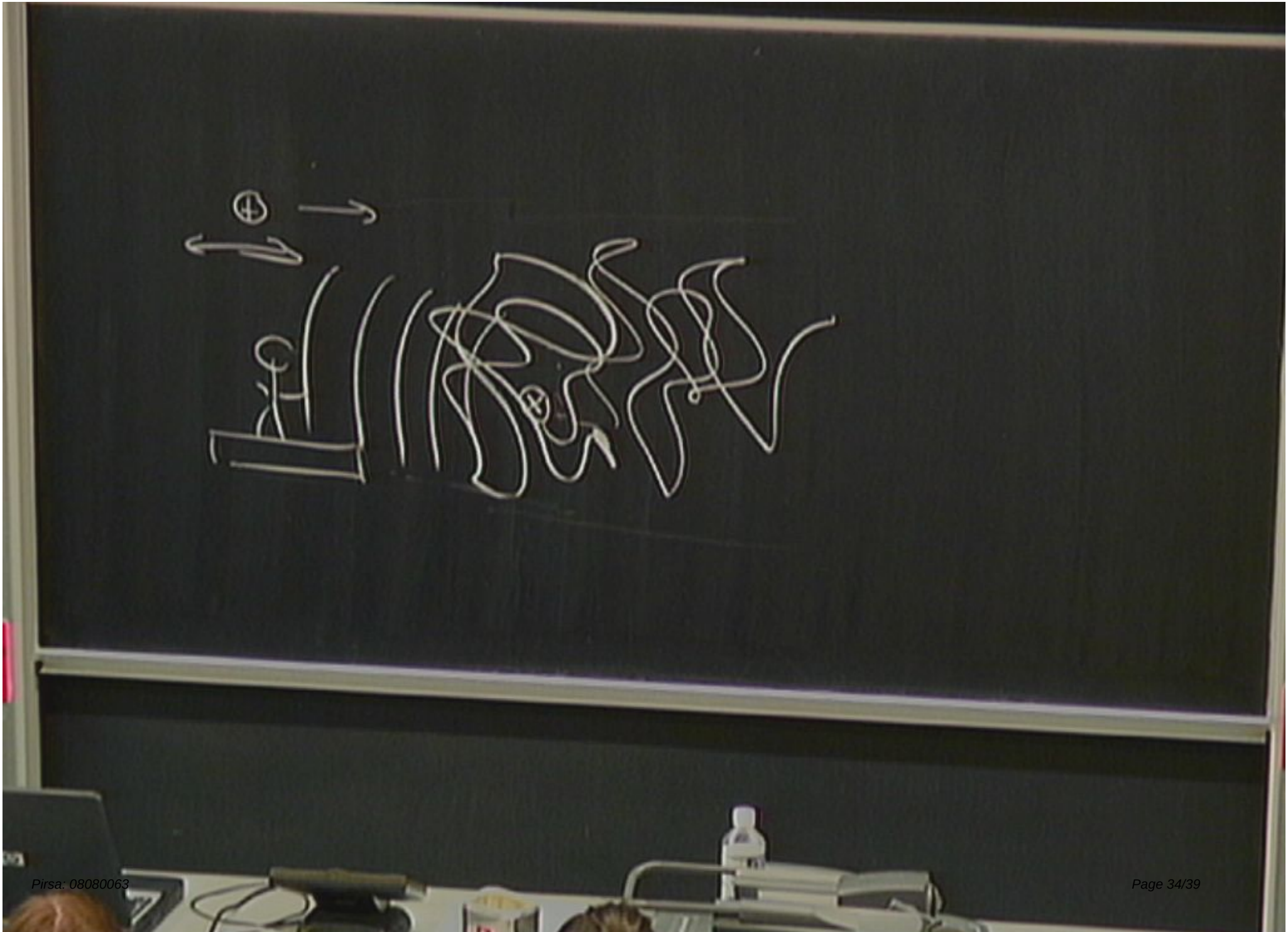


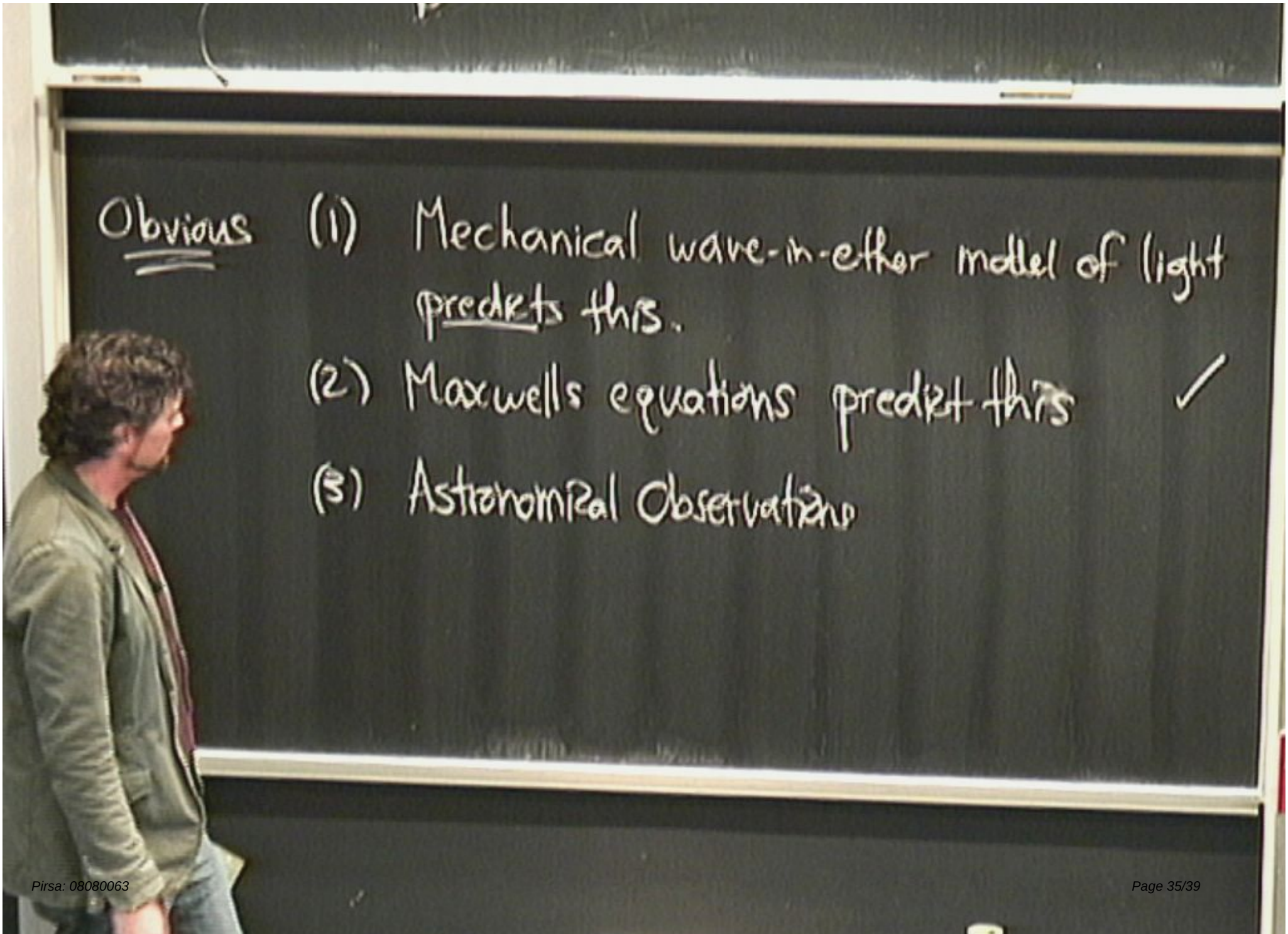










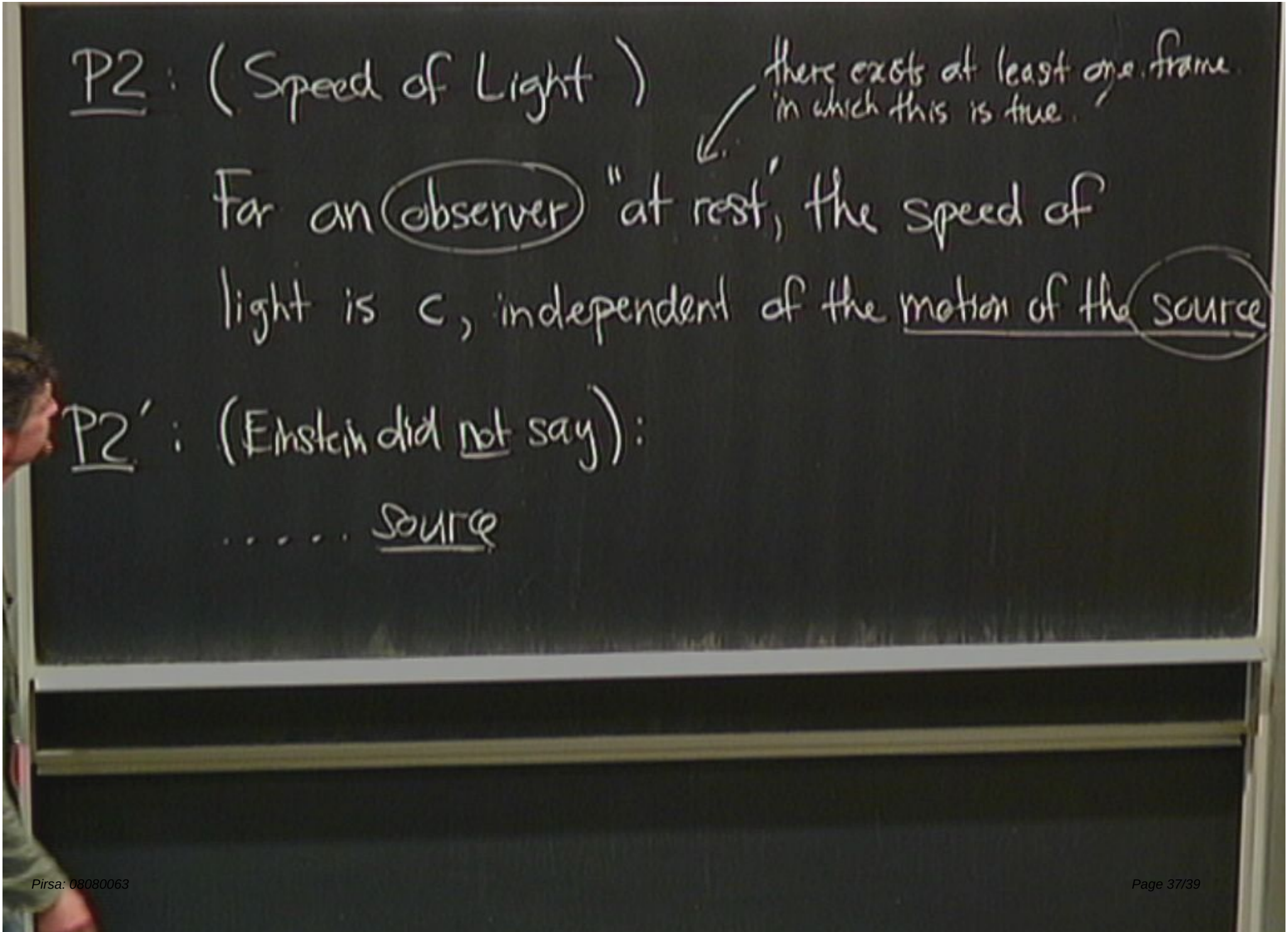

Obvious
(1) Mechanical wave-in-ether model of light predicts this.
(2) Maxwells equations predict this ✓
(3) Astronomical Observations

P2: (Speed of Light)

there exists at least one frame in which this is true.

For an observer "at rest", the speed of light is c, independent of the motion of the source

P2': (Einstein did not say):


P2: (Speed of Light)
there exists at least one frame in which this is true.
For an observer "at rest", the speed of light is c, independent of the motion of the source
P2': (Einstein did not say):
..... source

P2 : (Speed of Light)

"there exists at least one frame in which this is true."

For an observer "at rest", the speed of light is c, independent of the motion of the source

P2′ : (Einstein did not say):

. . . . . source

_ _ . _ _ _ _ _ _ ___ _ . observer

P2: (Speed of Light)

there exists at least one frame in which this is true.

For an observer "at rest", the speed of light is c, independent of the motion of the source

P2': (Einstein did not say):

..... source

- - - - - - - - - - - - observer