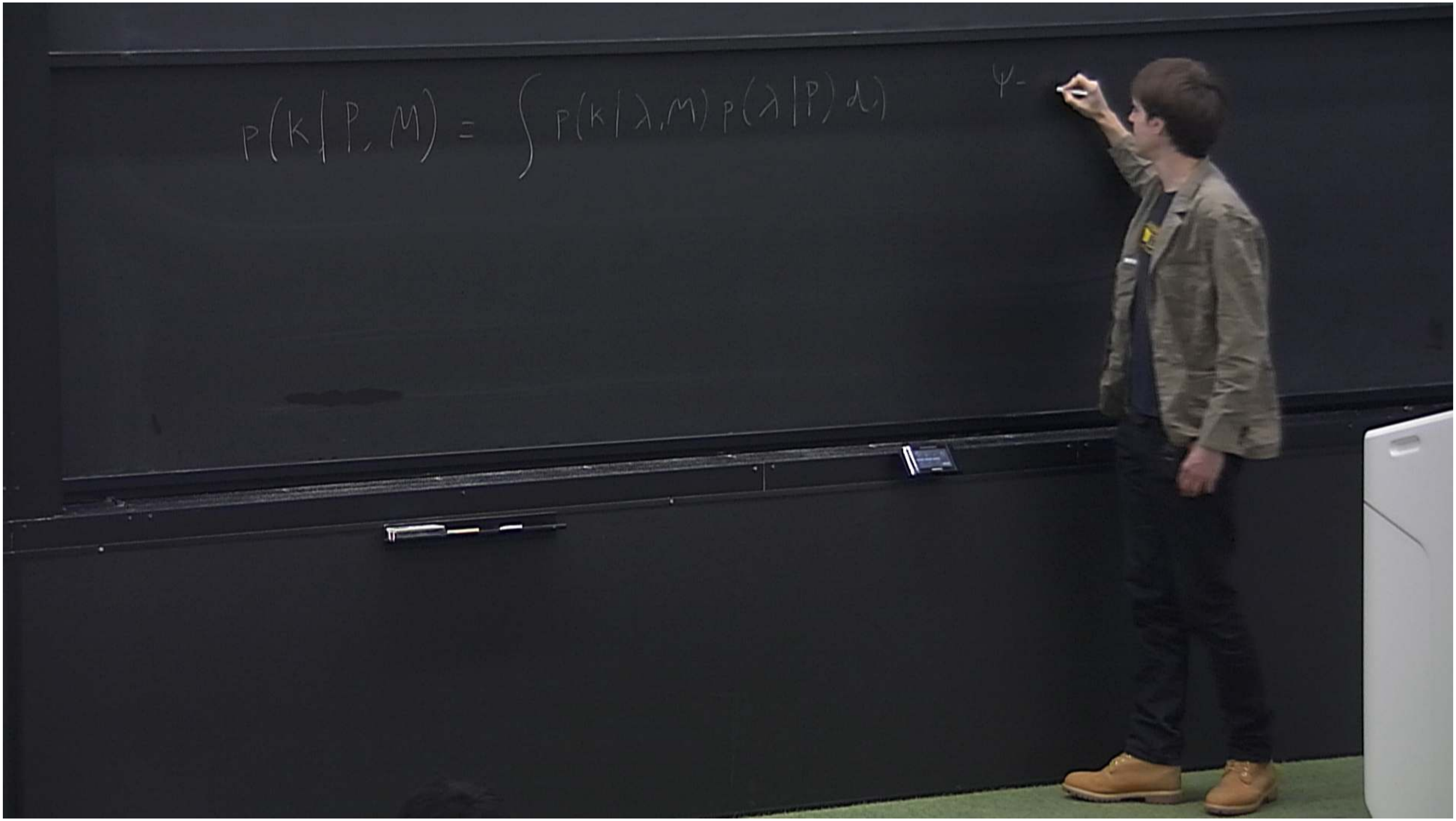
Title: PSI 2015/2016 Foundations of Quantum Mechanics - Lecture 14

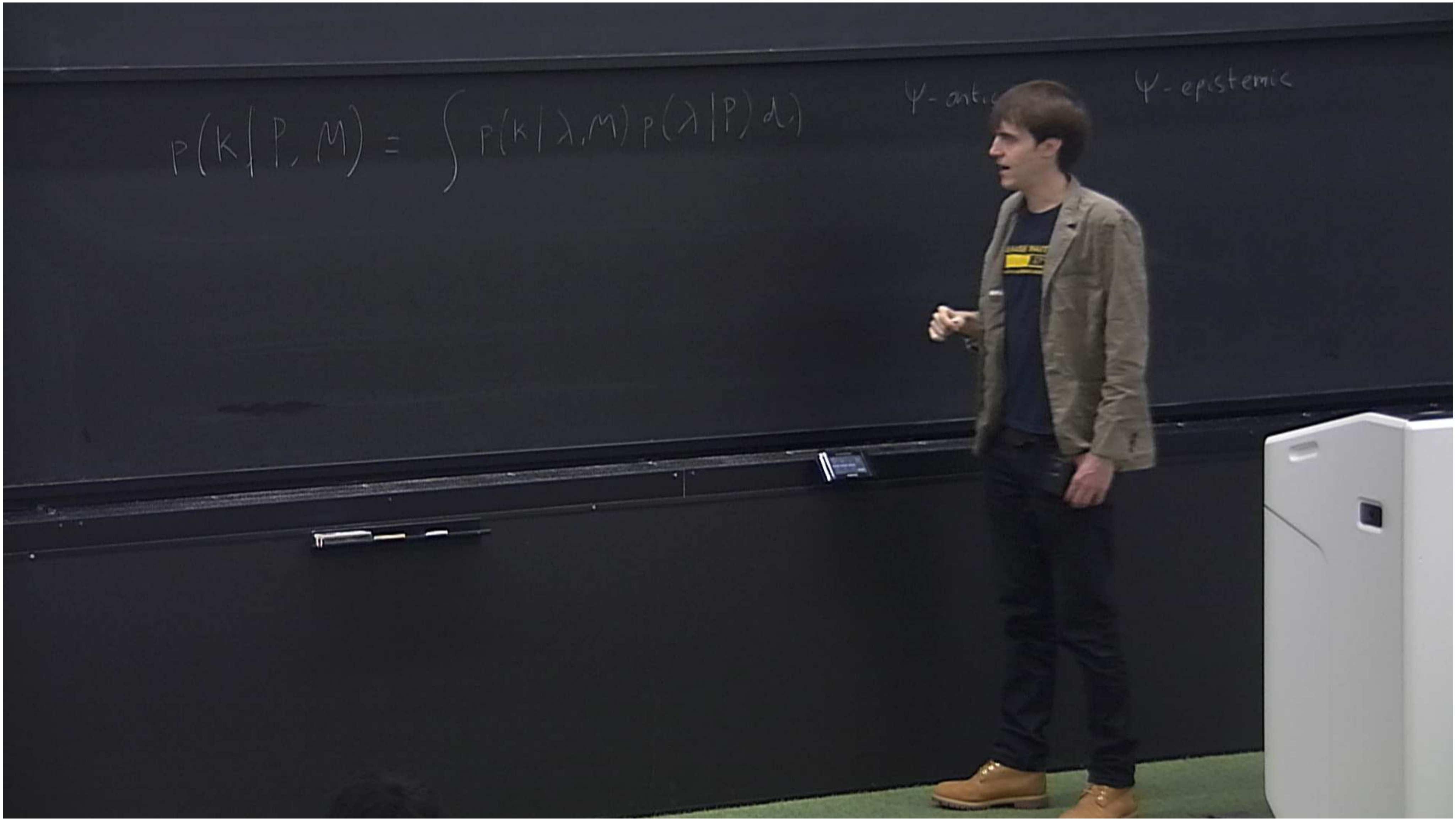
Date: Jan 21, 2016 11:30 AM

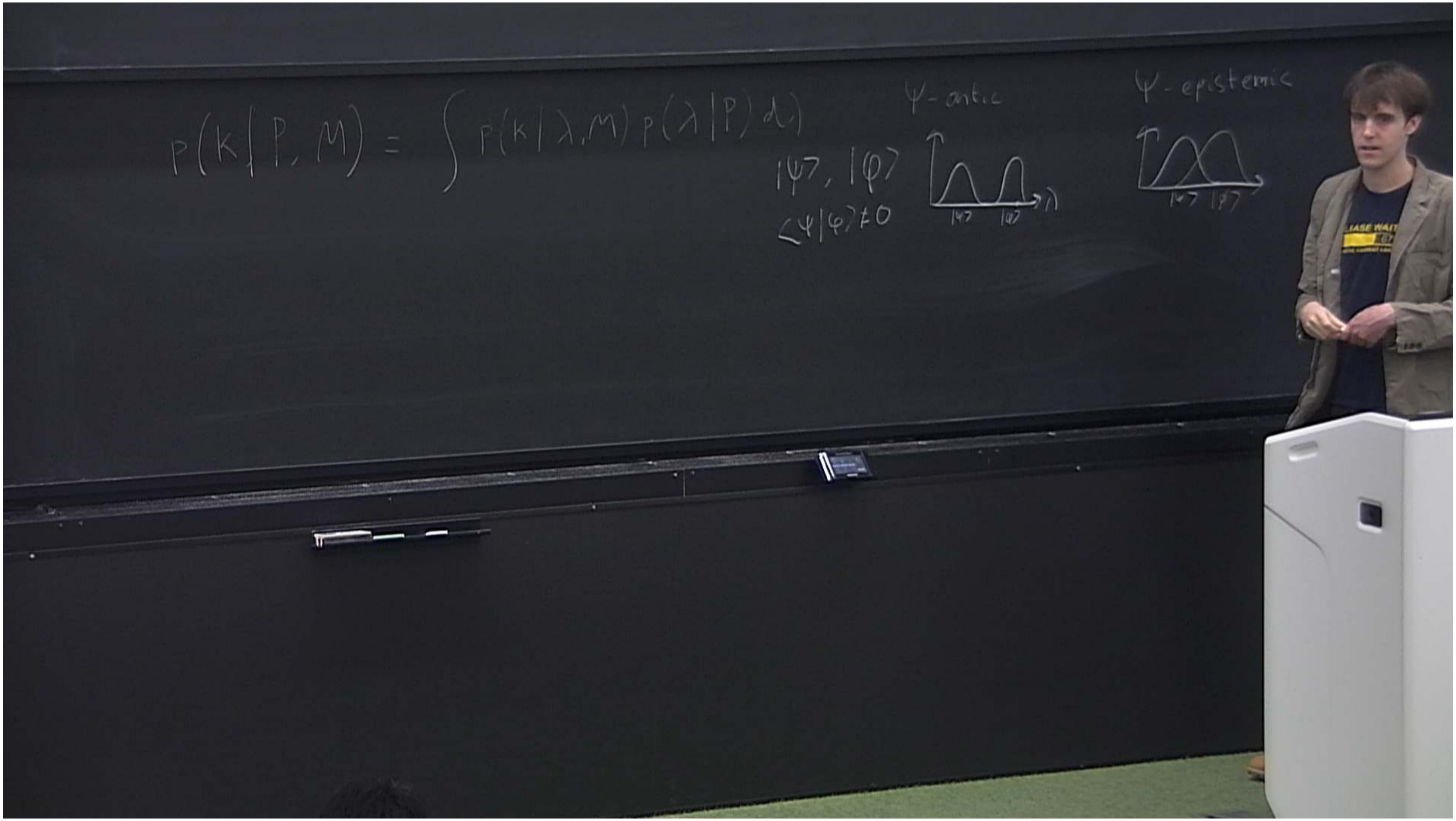
URL: http://pirsa.org/16010068

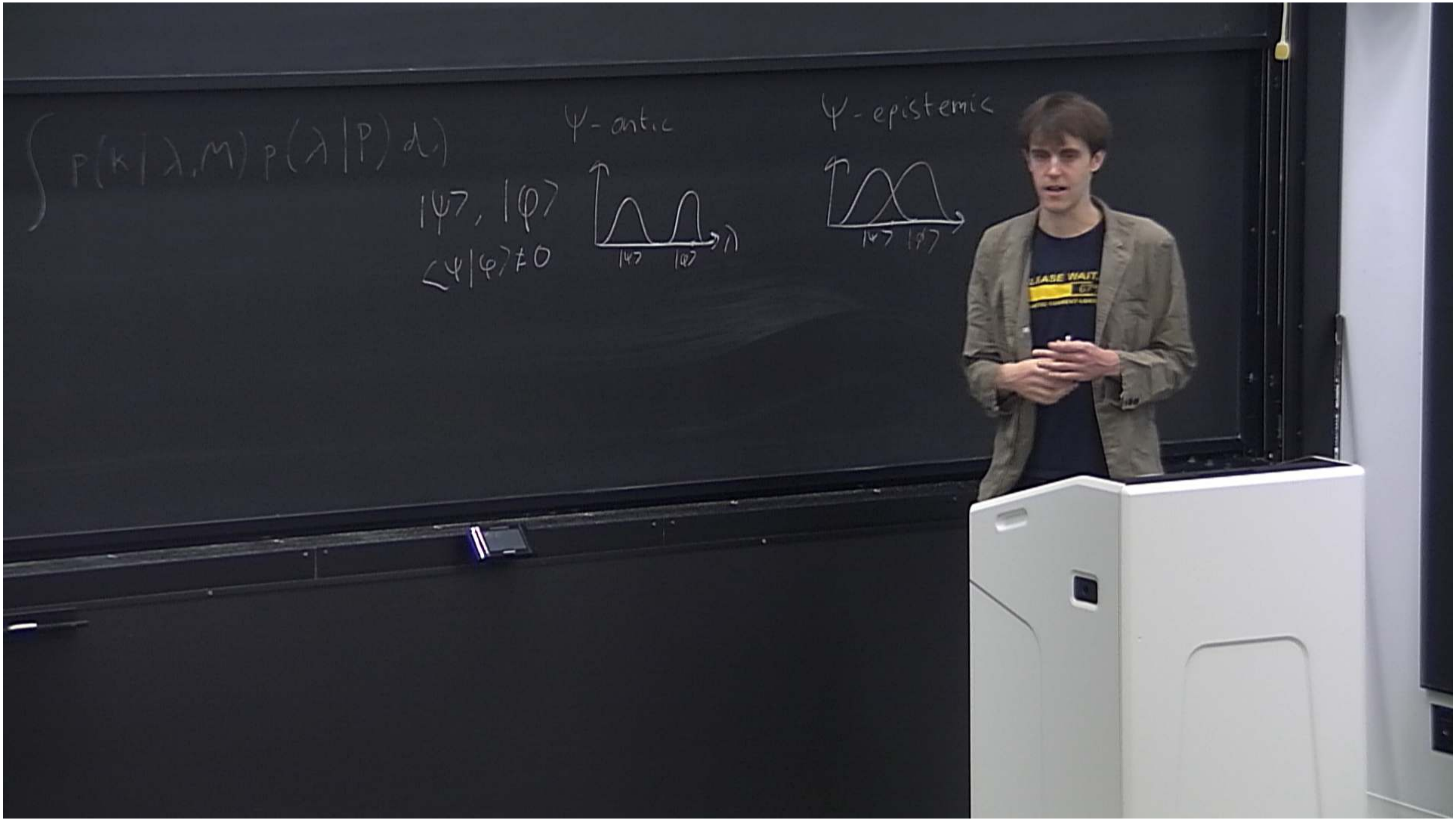
Abstract:


p(K | P, M)

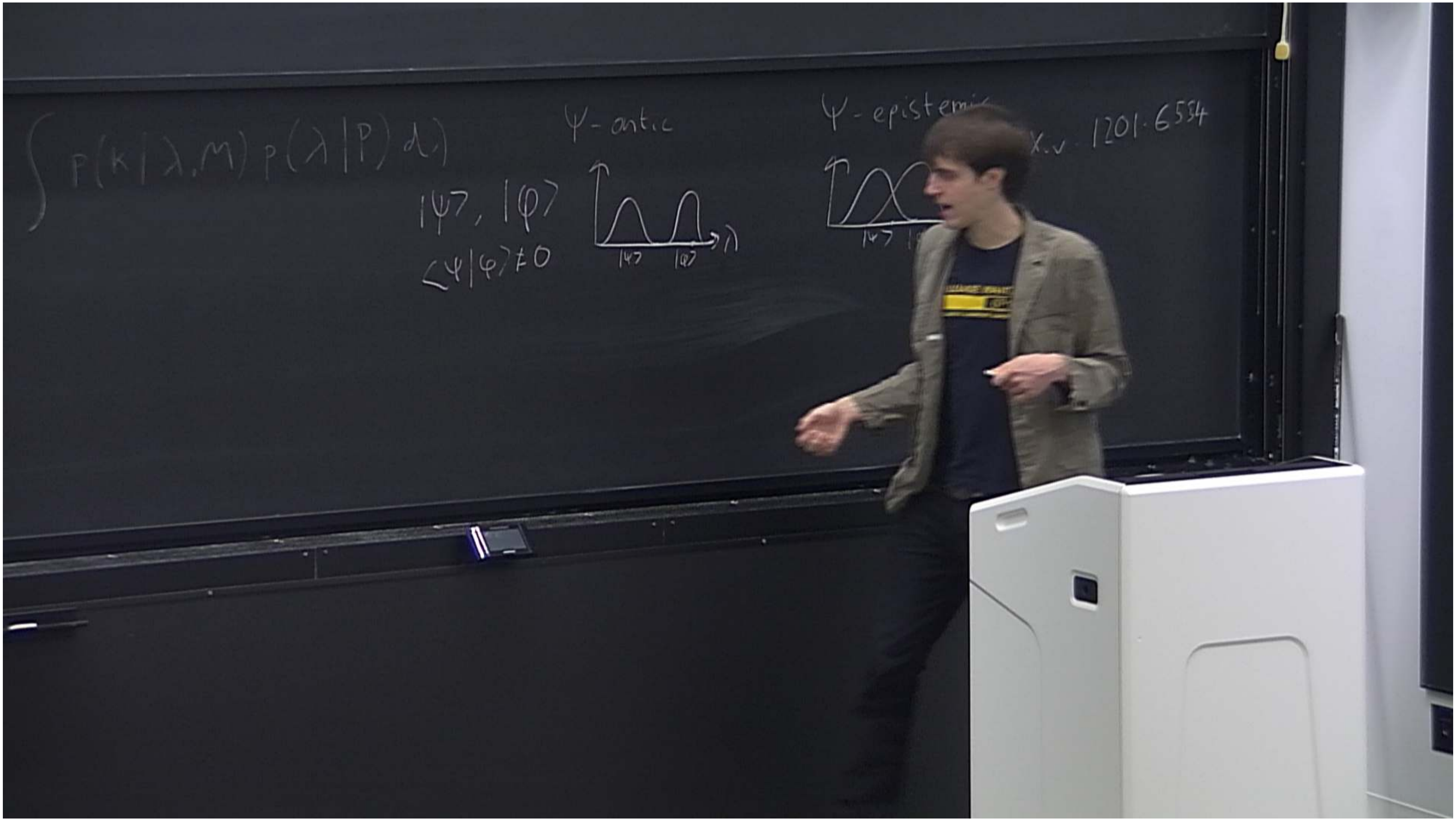

p(k|P, M) = ∫ p(k|λ,M) p(λ|P) dλ
ψ

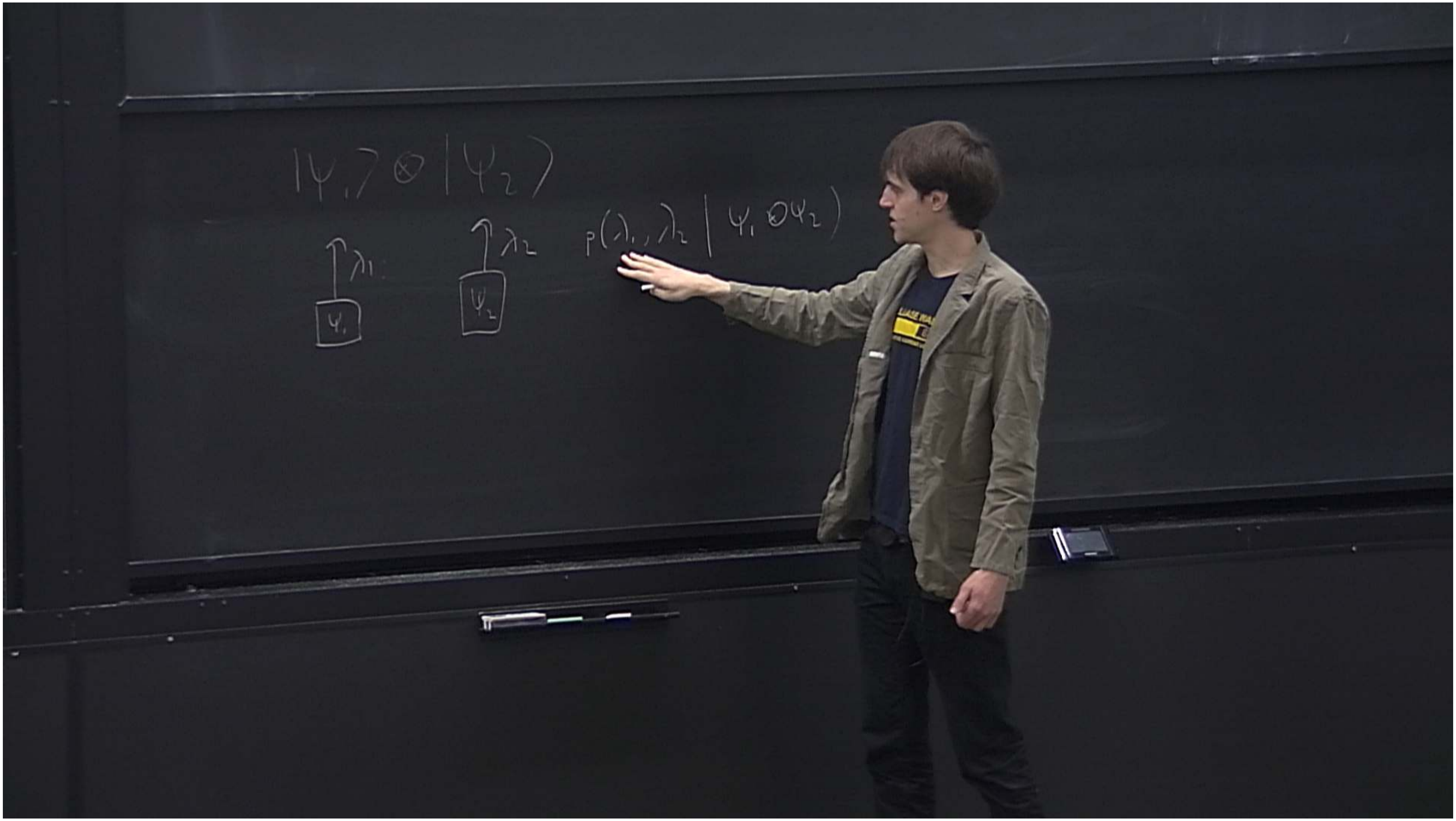

p(k|P, M) = ∫ p(k|λ,M) p(λ|P) dλ
ψ - ontic
ψ - epistemic


p(k|P,M) = ∫ p(k|λ,M) p(λ|P) dλ
ψ - ontic
ψ - epistemic
|ψ⟩, |φ⟩
⟨ψ|φ⟩ ≠ 0
|ψ⟩ |φ⟩
λ

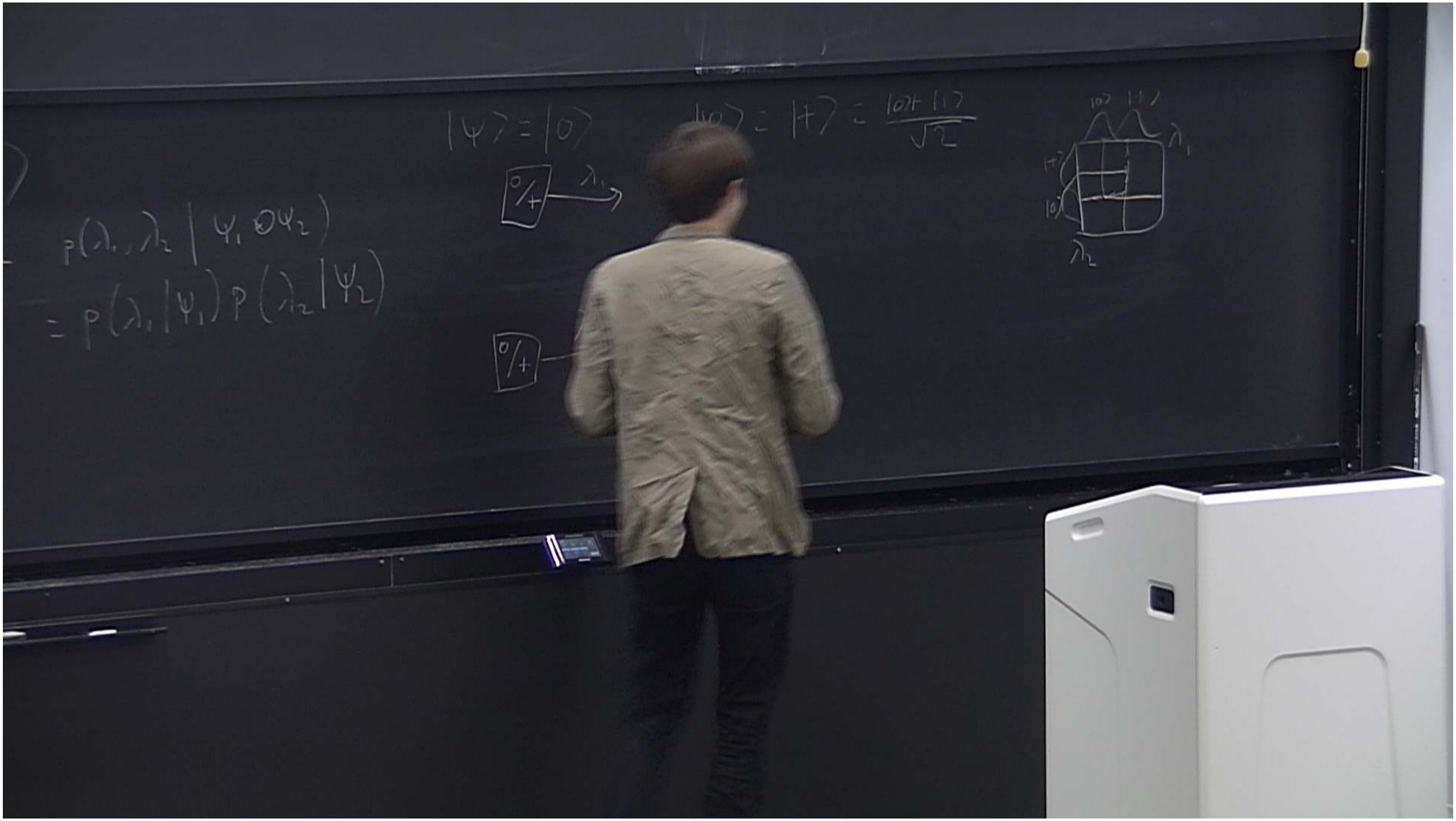


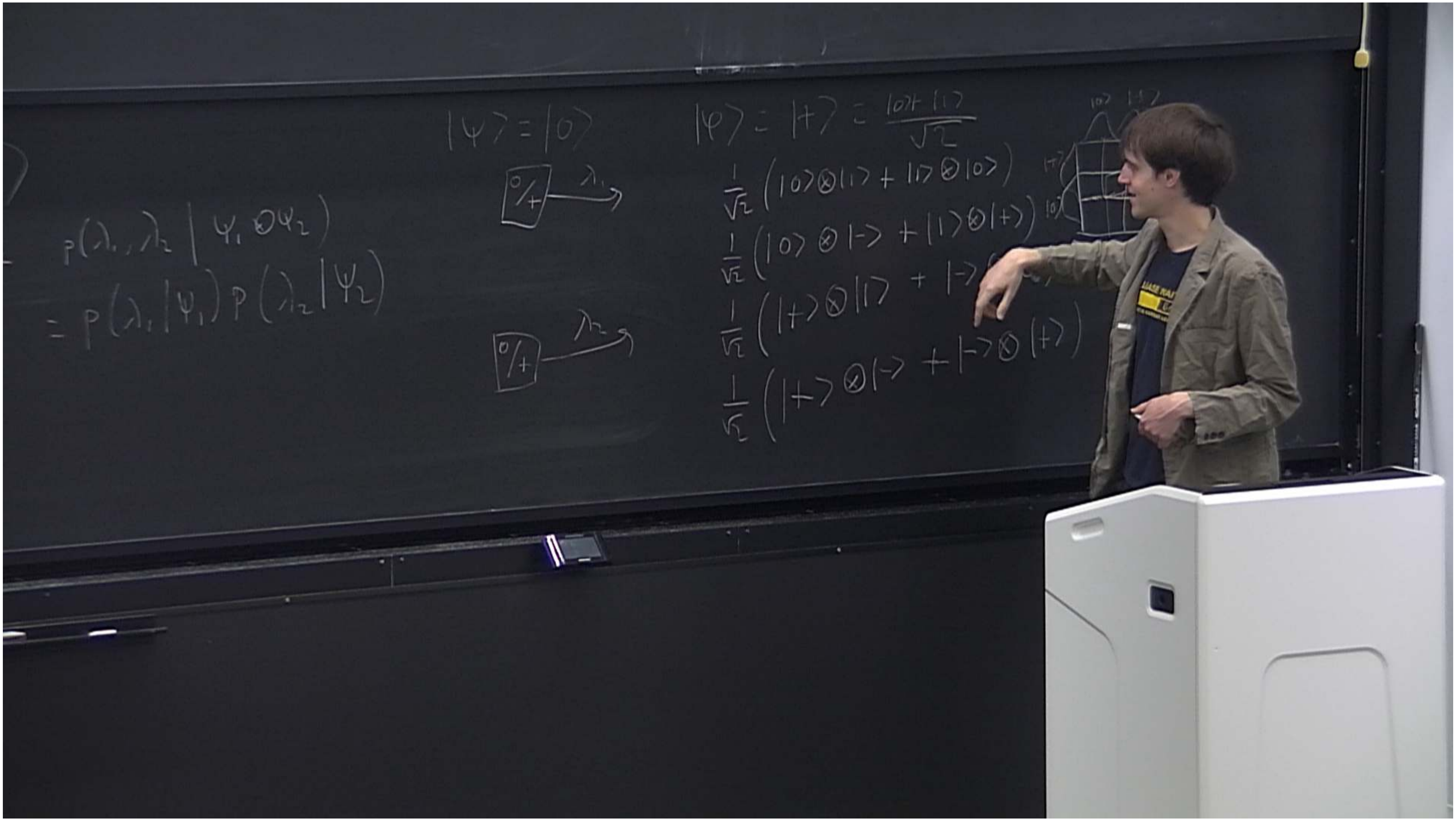
Ψ - ontic
Ψ - epistemic
|ψ⟩, |φ⟩
⟨ψ|φ⟩ ≠ 0

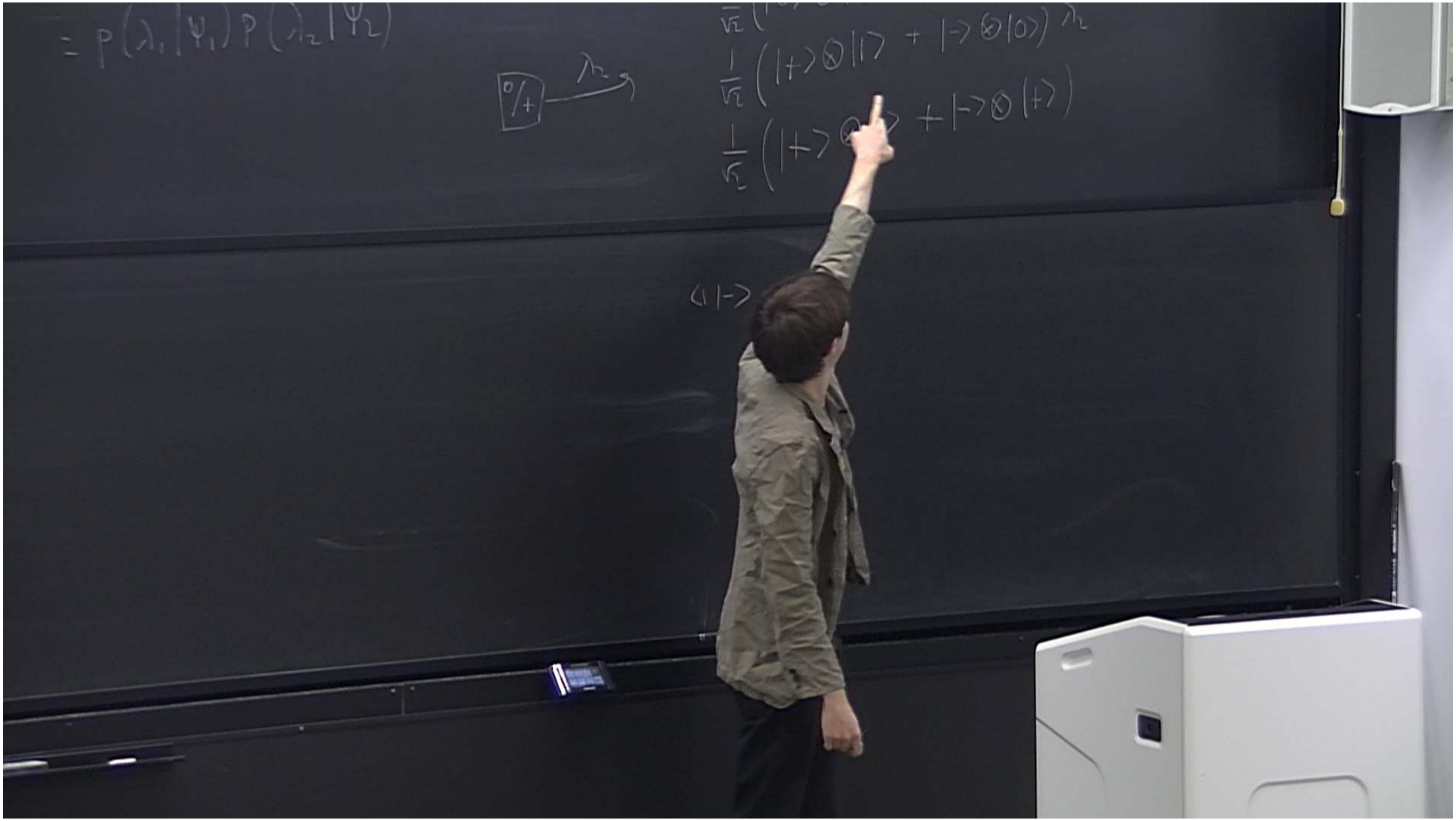

∫ p(k|λ,M) p(λ|P) dλ
ψ - ontic
ψ - epistemic
1201.6554
|ψ⟩, |φ⟩
⟨ψ|φ⟩≠0
λ

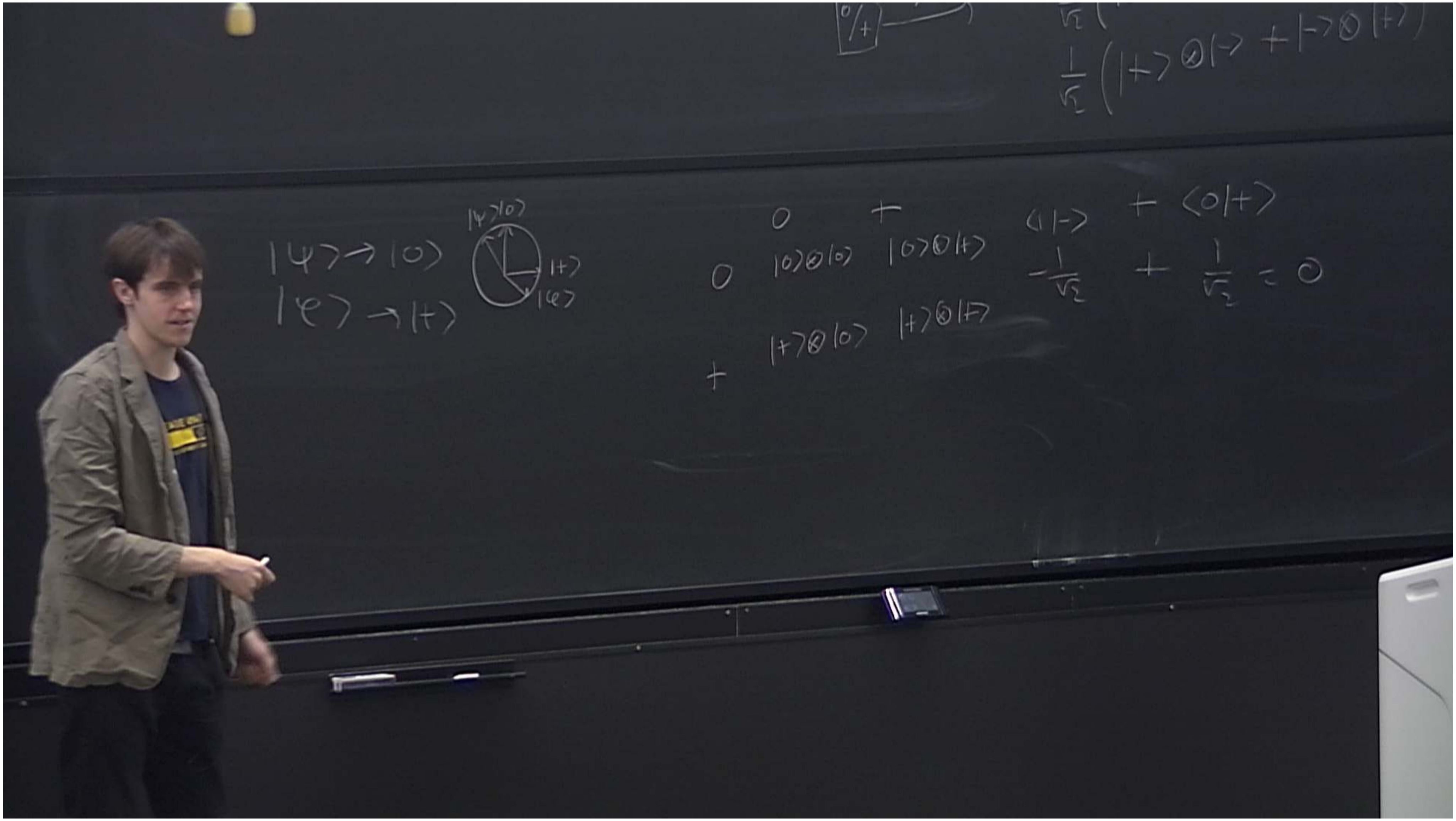

|ψ1⟩ ⊗ |ψ2⟩
λ1
λ2
p(λ1, λ2 | ψ1 ⊗ ψ2)
ψ1
ψ2


|ψ⟩ = |0⟩
|ψ⟩ = |+⟩ = |0⟩+|1⟩
p(λ1, λ2 | ψ1 ⊗ ψ2)
= p(λ1 | ψ1) p(λ2 | ψ2)
0/+
λ1
λ2
PLEASE WAIT
67%

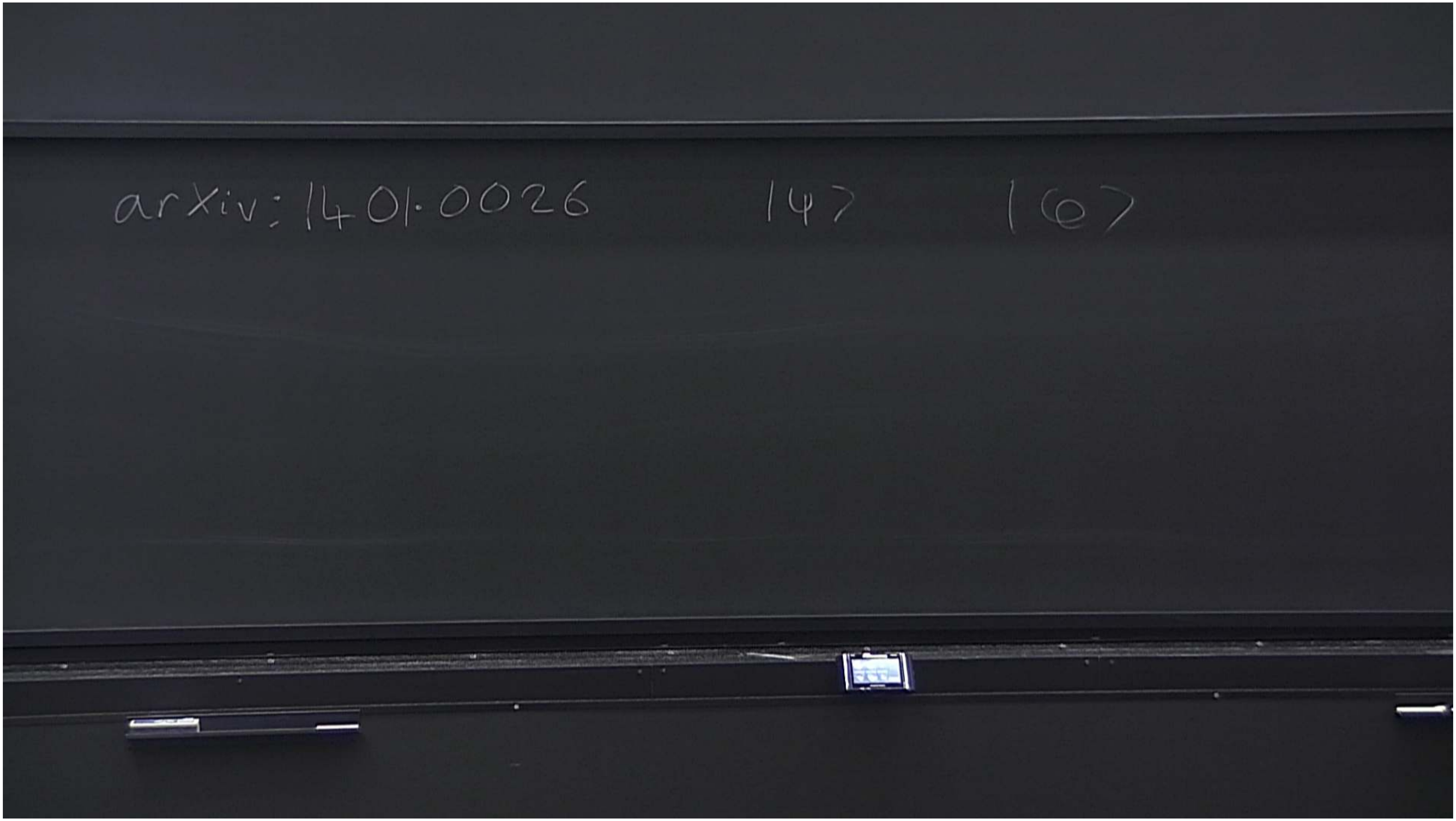

|ψ> = |0>
|0> = |+> = (|0> + |1>)/√2
p(λ1, λ2 | ψ1 ⊗ ψ2)
= p(λ1 | ψ1) p(λ2 | ψ2)
0/+
λ1
λ2

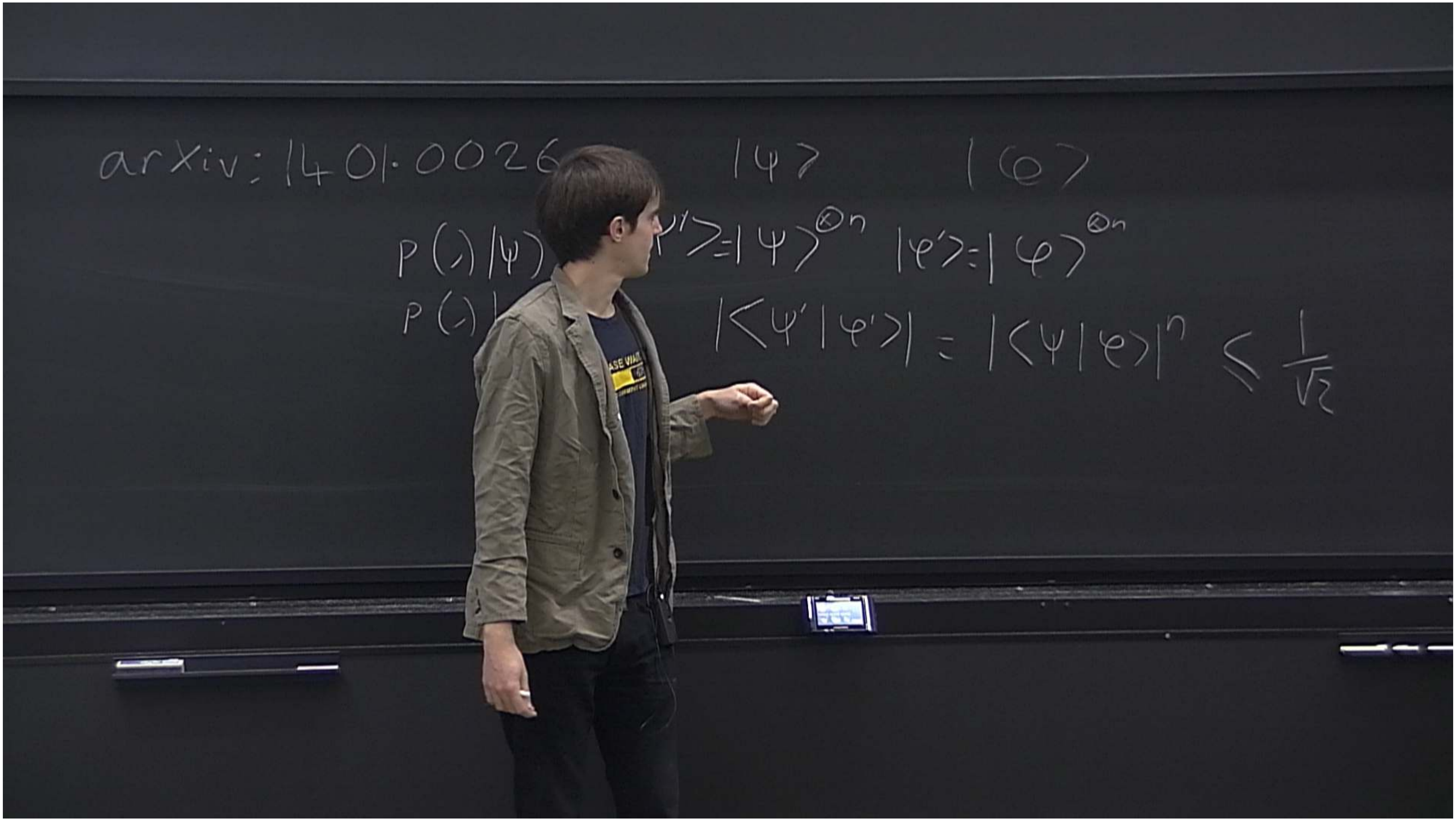

$p(\lambda_1, \lambda_2 \mid \psi_1 \otimes \psi_2)$
$= p(\lambda_1 \mid \psi_1)\, p(\lambda_2 \mid \psi_2)$
$|\psi\rangle = |0\rangle$
λ_1
λ_2
$|\psi\rangle = |+\rangle = \frac{|0\rangle + |1\rangle}{\sqrt{2}}$
$\frac{1}{\sqrt{2}}(|0\rangle \otimes |1\rangle + |1\rangle \otimes |0\rangle)$
$\frac{1}{\sqrt{2}}(|0\rangle \otimes |-\rangle + |1\rangle \otimes |+\rangle)$
$\frac{1}{\sqrt{2}}(|+\rangle \otimes |1\rangle + |-\rangle$
$\frac{1}{\sqrt{2}}(|+\rangle \otimes |-\rangle + |-\rangle \otimes |+\rangle)$
$\frac{1}{\sqrt{2}}(|+\rangle$

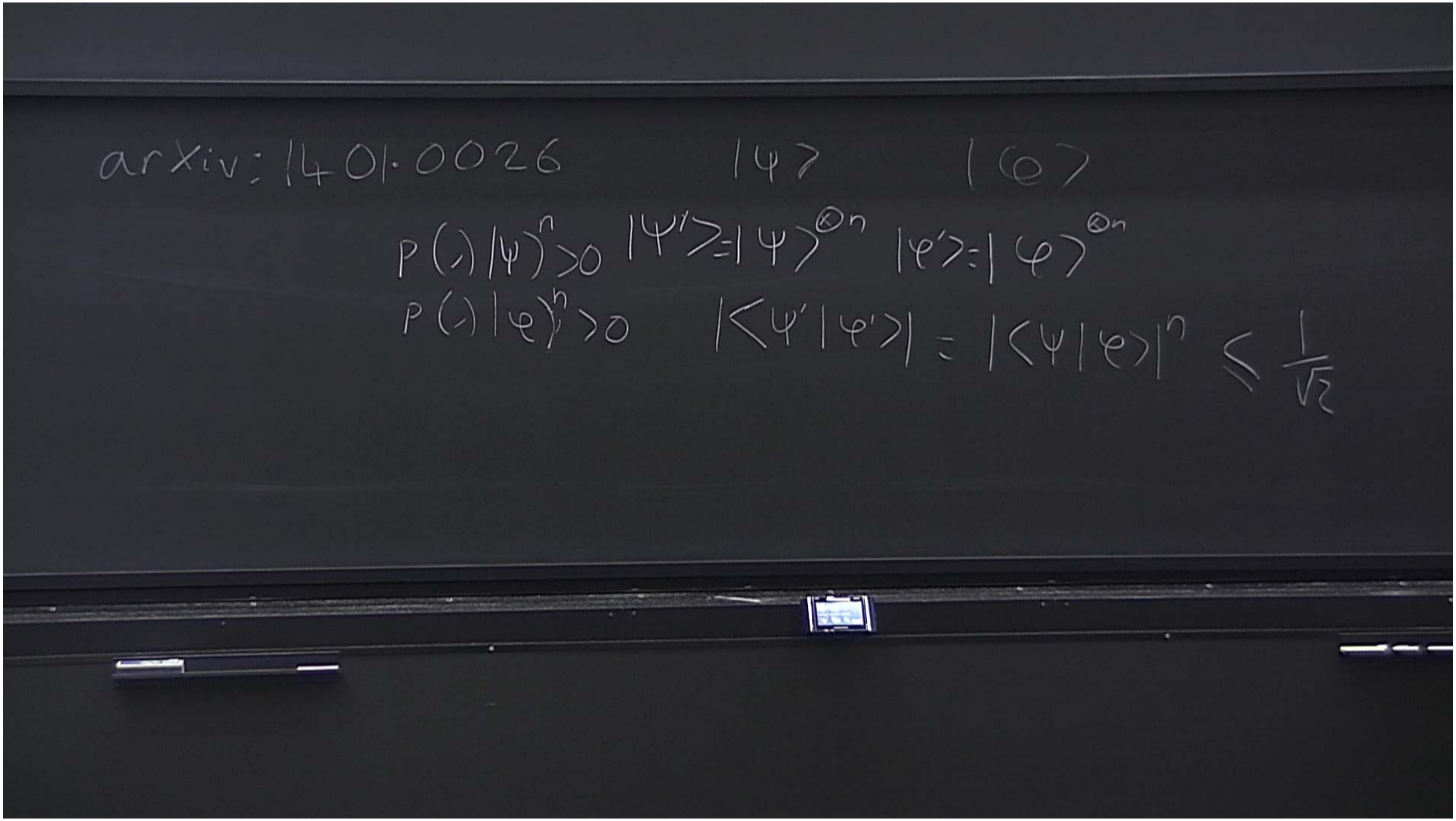


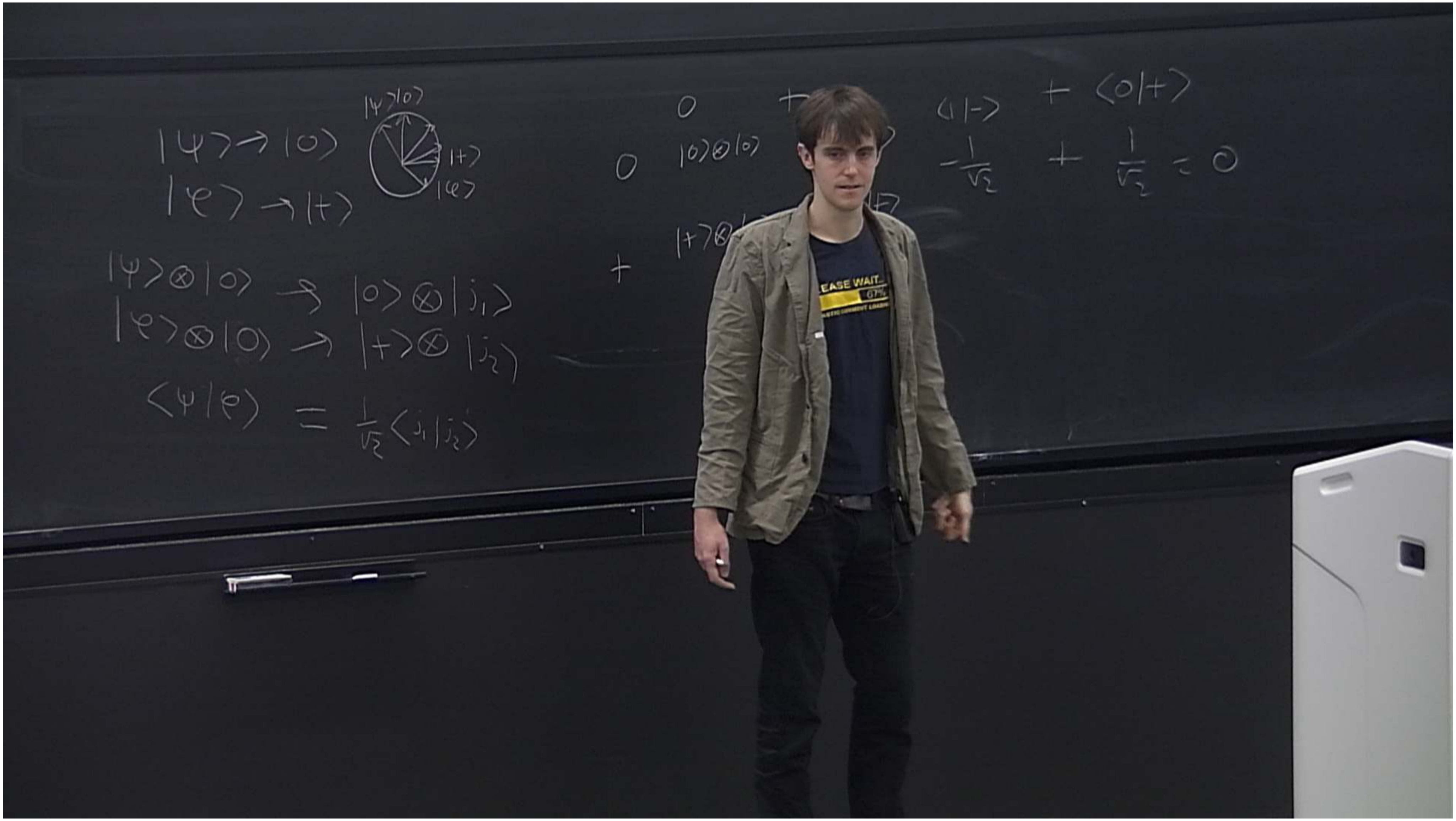

|ψ⟩ → |0⟩
|φ⟩ → |+⟩
|0⟩⊗|0⟩ |0⟩⊗|+⟩
|+⟩⊗|0⟩ |+⟩⊗|+⟩
⟨1|−⟩ + ⟨0|+⟩
−1/√2 + 1/√2 = 0

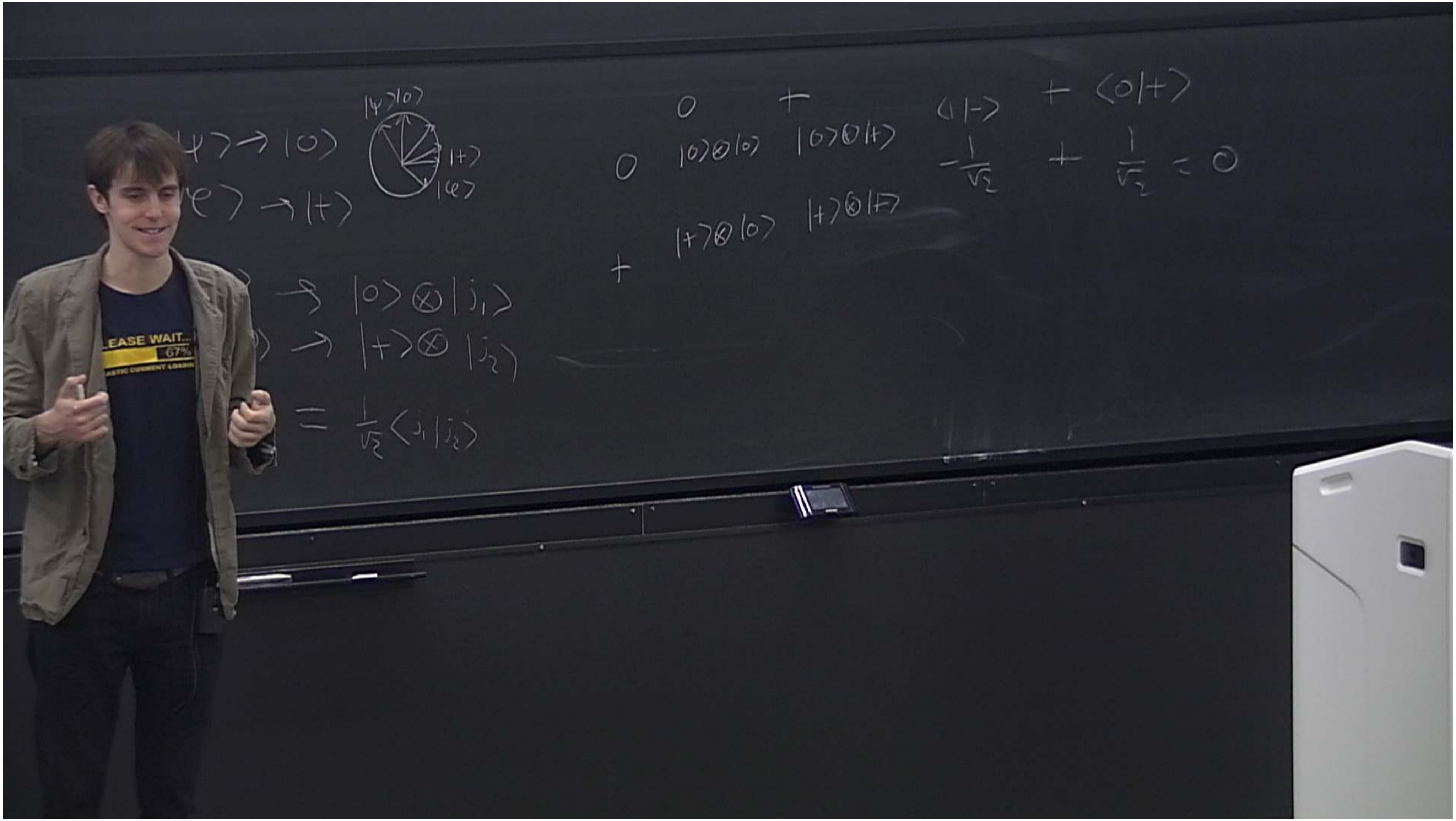

arXiv:1401.0026

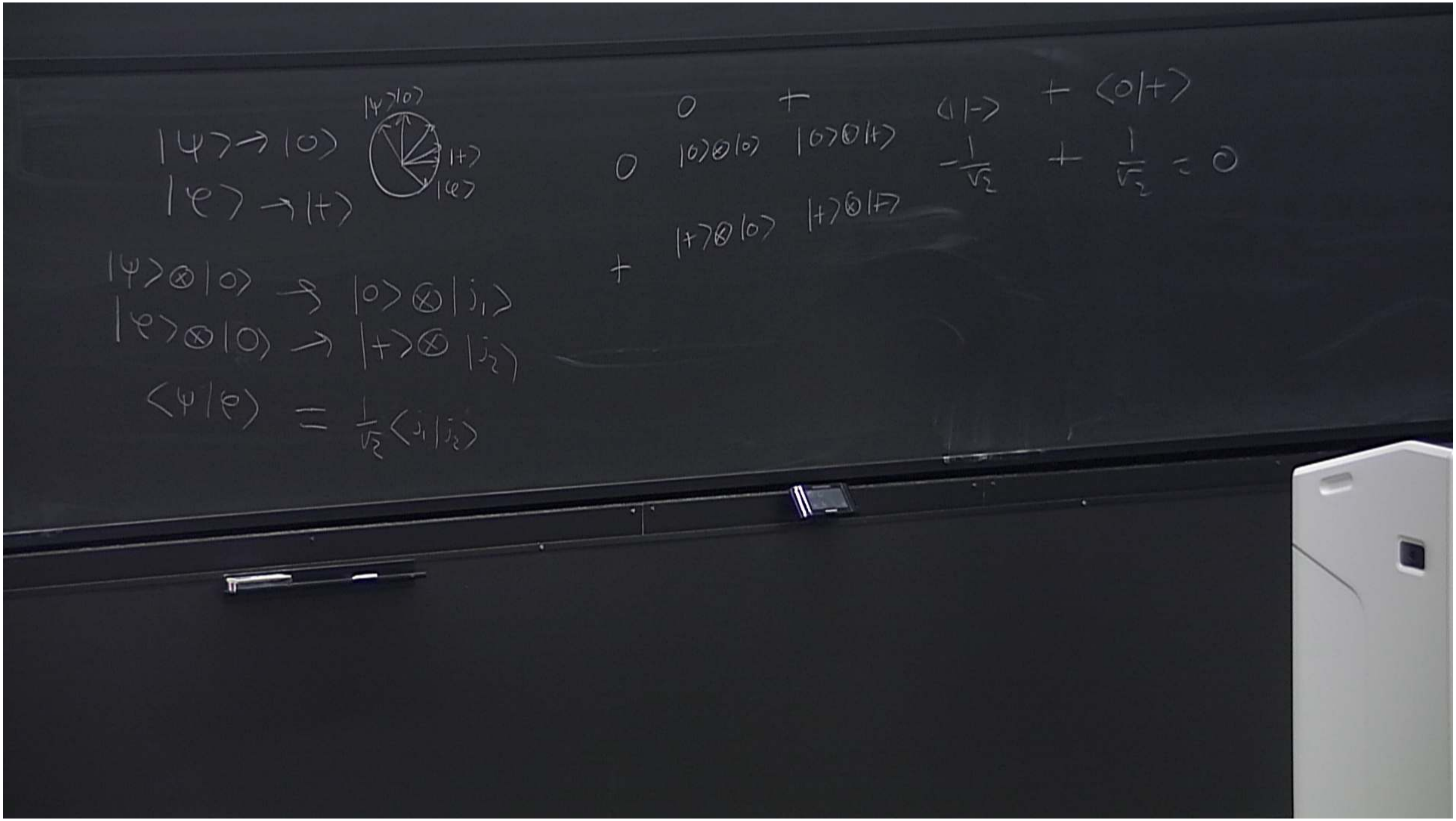

arXiv:1401.0026
$|\psi\rangle$
$|\phi\rangle$

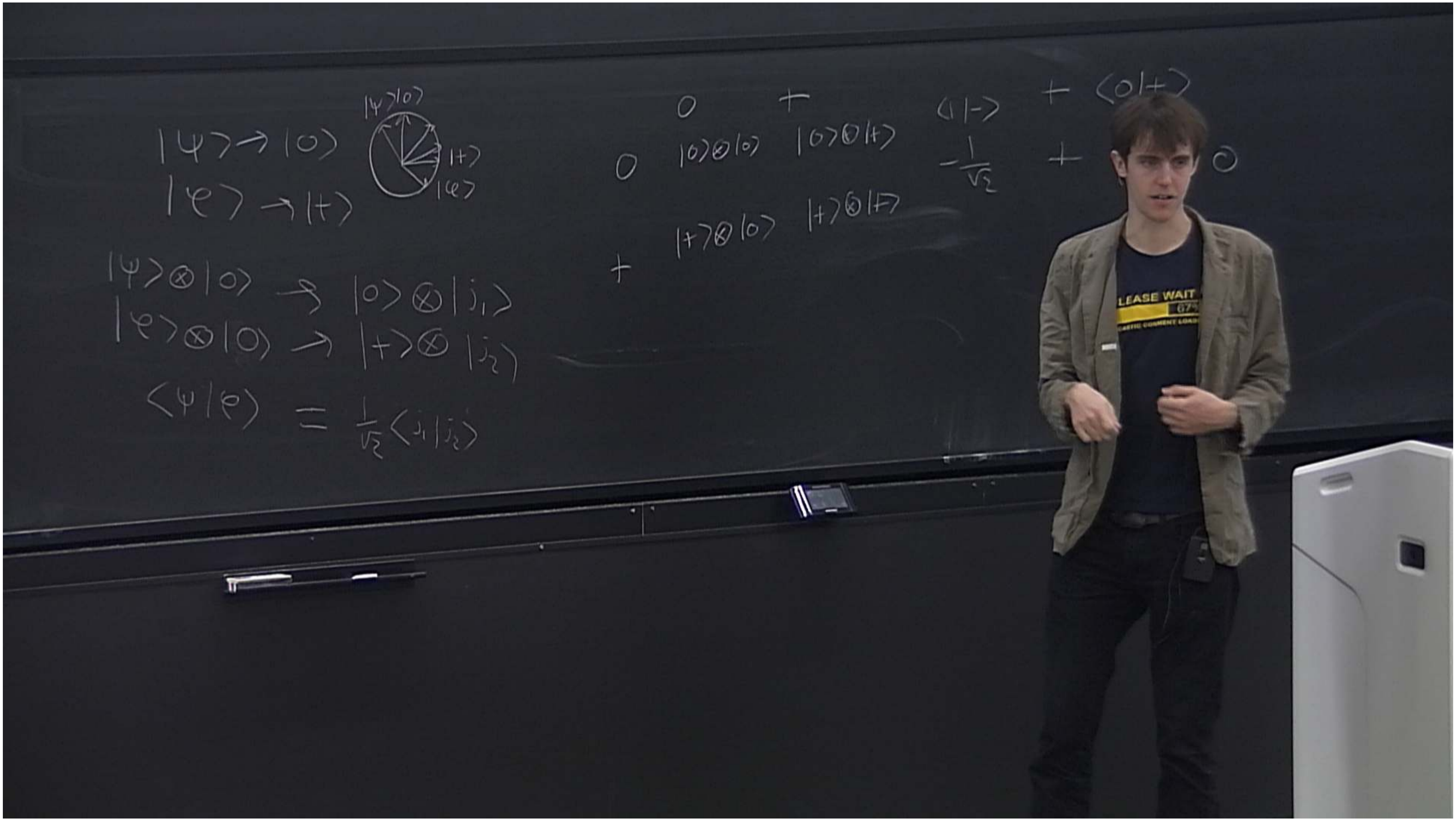

arXiv:1401.0026
|ψ>
|φ>
|ψ'>=|ψ>^⊗n
|φ'>=|φ>^⊗n
|<ψ'|φ'>| = |<ψ|φ>|^n ≤ 1/√2

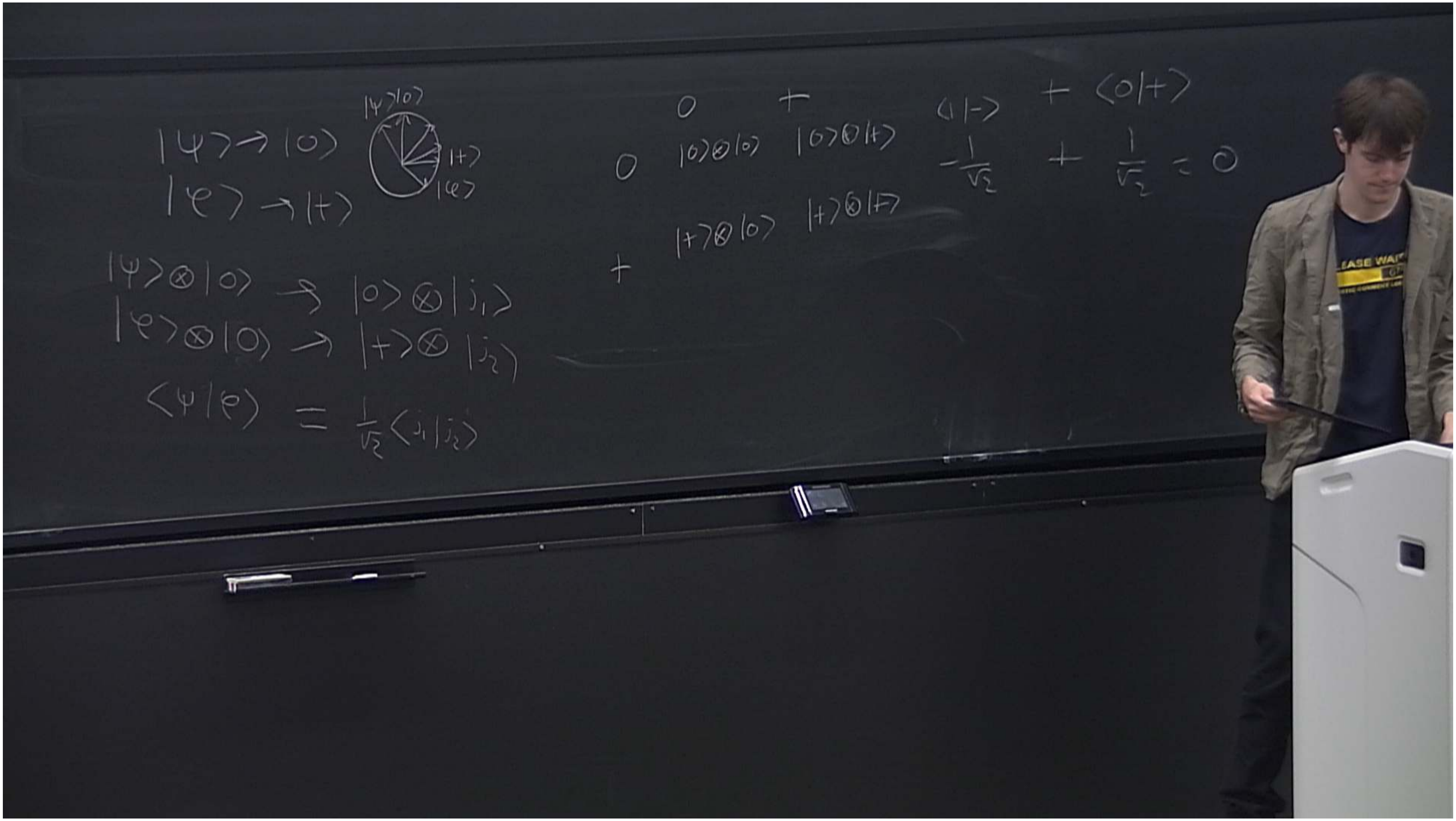

arxiv:1401.0026
$|\psi\rangle$
$|\varphi\rangle$
$P(\cdot)|\psi\rangle^n > 0$
$|\psi'\rangle = |\psi\rangle^{\otimes n}$
$|\varphi'\rangle = |\varphi\rangle^{\otimes n}$
$P(\cdot)|\varphi\rangle^n > 0$
$|\langle\psi'|\varphi'\rangle| = |\langle\psi|\varphi\rangle|^n \leq \frac{1}{\sqrt{2}}$






|ψ> → |0>
|φ> → |+>
|ψ>|0>
|+>
|φ>
|ψ> ⊗ |0> → |0> ⊗ |j₁>
|φ> ⊗ |0> → |+> ⊗ |j₂>
<ψ|φ> = 1/√2 <j₁|j₂>
0 + <1|-> + <0|+>
0 |0>⊗|0> |0>⊗|+> -1/√2 + 1/√2 = 0
|+>⊗|0> |+>⊗|+>
+


|ψ> → |0>
|φ> → |+>
|ψ>⊗|0> → |0>⊗|j₁>
|φ>⊗|0> → |+>⊗|j₂>
<ψ|φ> = 1/√2 <j₁|j₂>
|0>⊗|0> |0>⊗|+>
|+>⊗|0> |+>⊗|+>
LEASE WAIT
67%


|ψ⟩ → |0⟩
|φ⟩ → |+⟩
|ψ⟩⊗|0⟩ → |0⟩⊗|j₁⟩
|φ⟩⊗|0⟩ → |+⟩⊗|j₂⟩
⟨ψ|φ⟩ = 1/√2 ⟨j₁|j₂⟩
|0⟩⊗|0⟩ |0⟩⊗|+⟩
|+⟩⊗|0⟩ |+⟩⊗|+⟩
+ ⟨0|+⟩
= 0