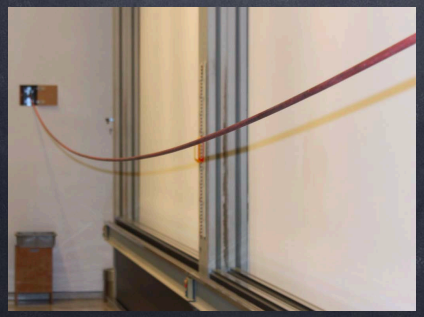
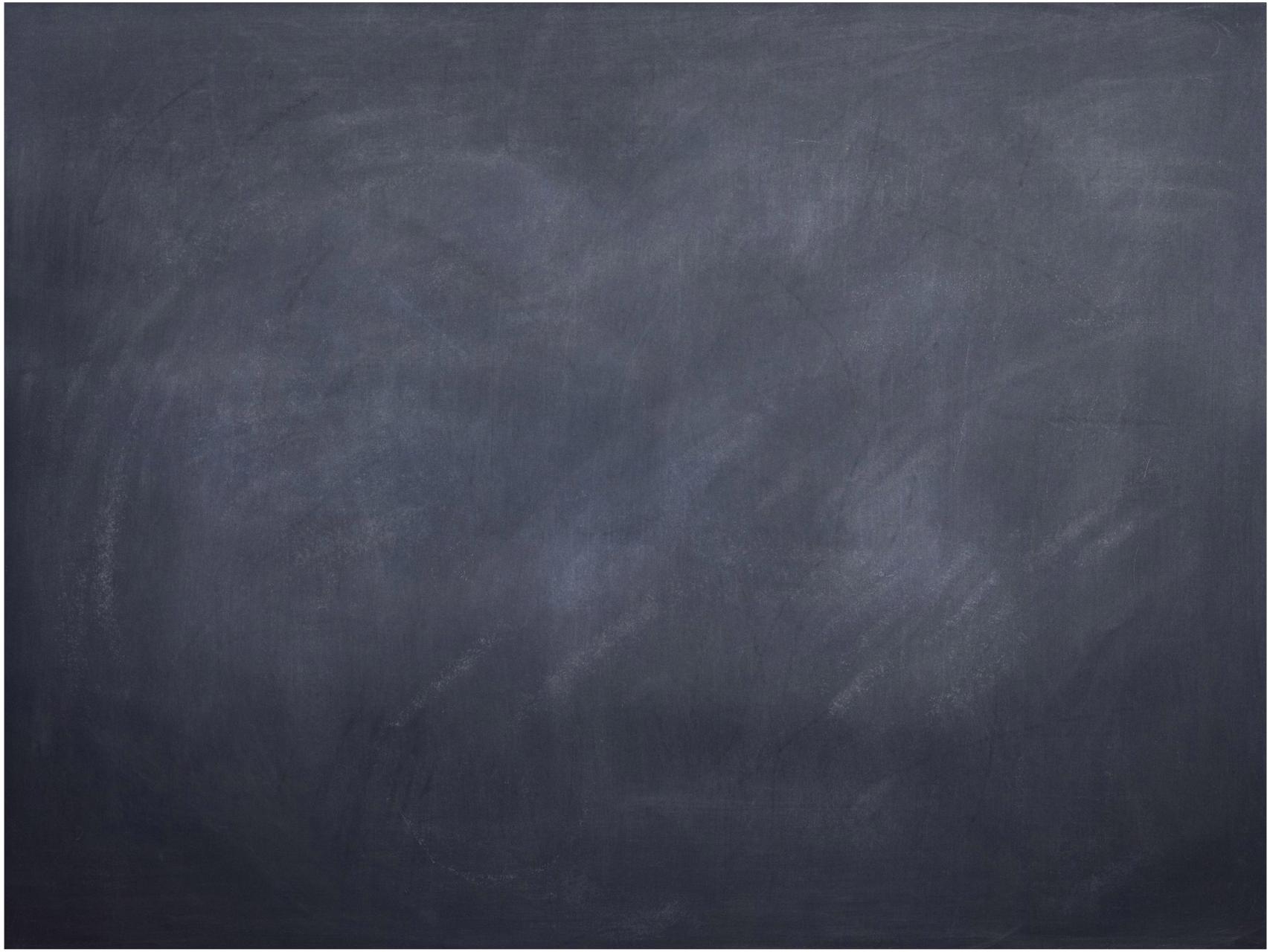
PHY117 HS2026

Week 11, Lecture 2
Nov. 25th, 2026
Prof. Ben Kilminster
Prof. Florencia Canelli

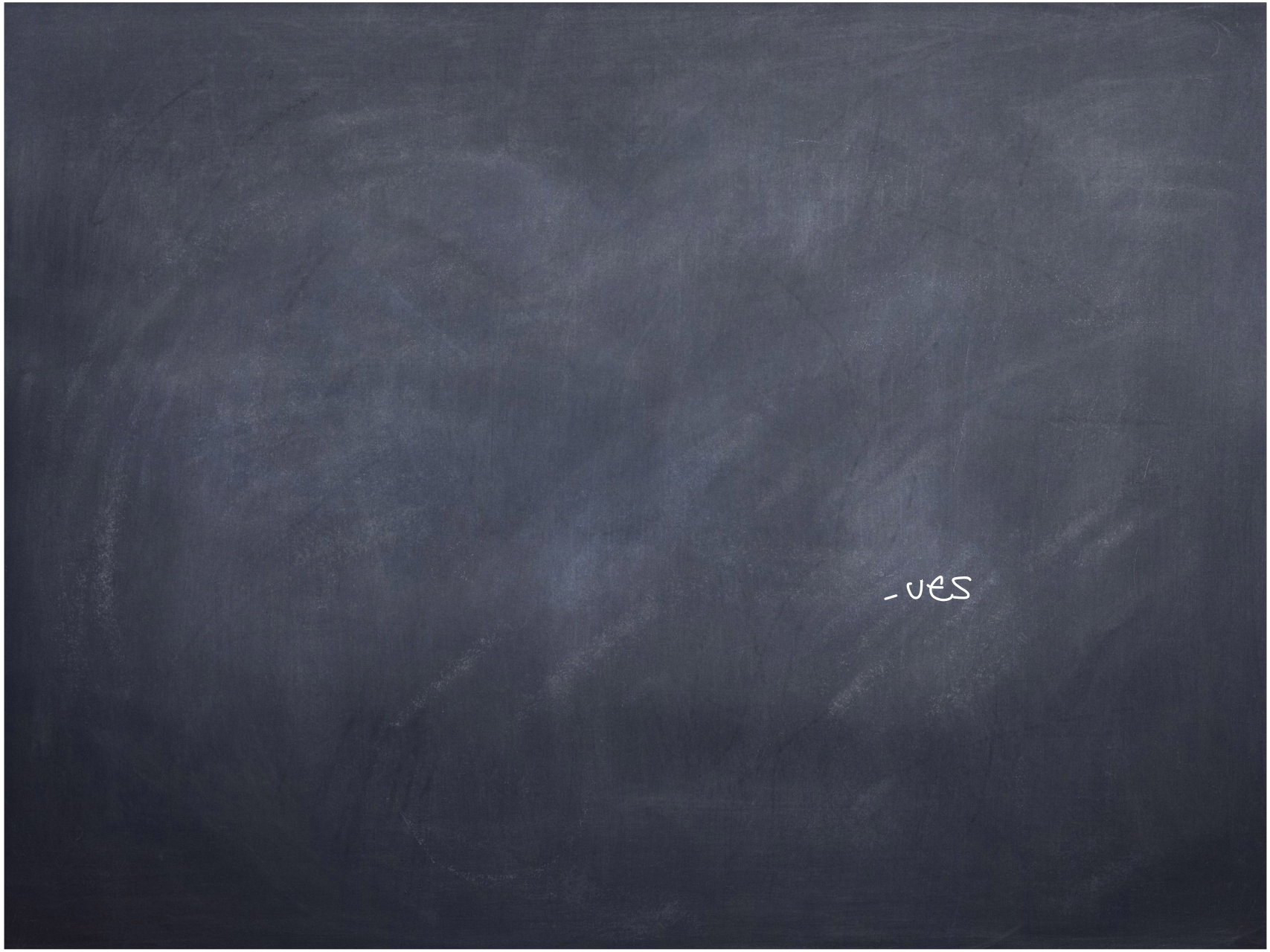
Today:
waves
standing waves

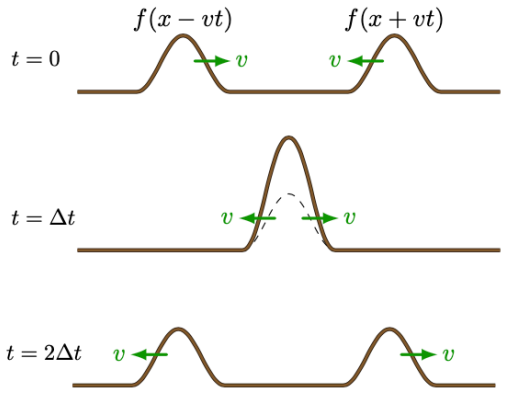
WAVES



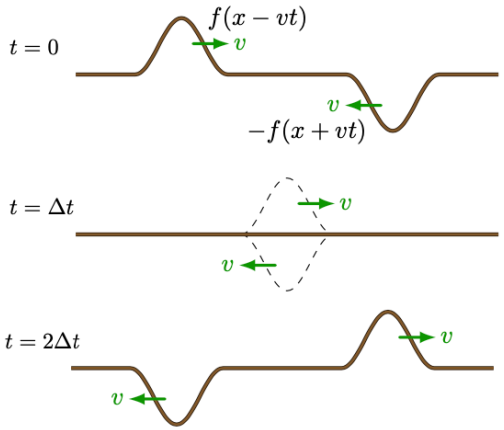





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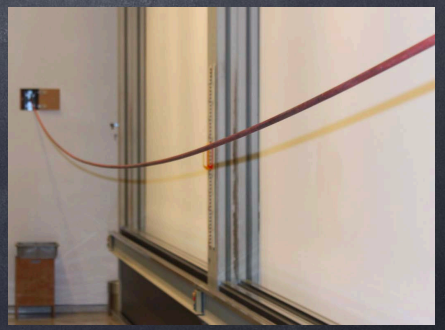


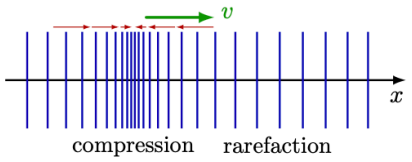
(a) Constructive interference happens when two oppositely waves meet on a string.



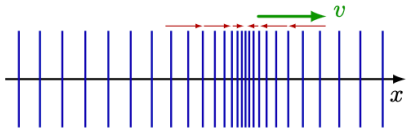
(b) Destructive interference. If the waves are the same but for a sign, they cancel completely.

Figure 13.5: Superposition between two oppositely travelling waves in the same medium is a simple linear sum.



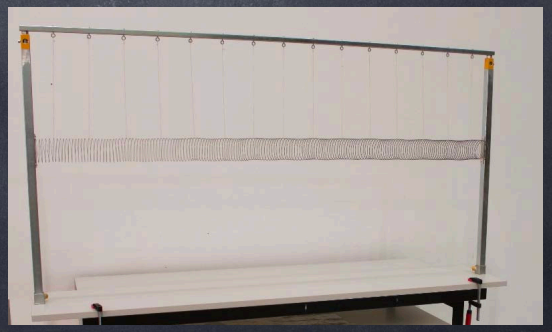


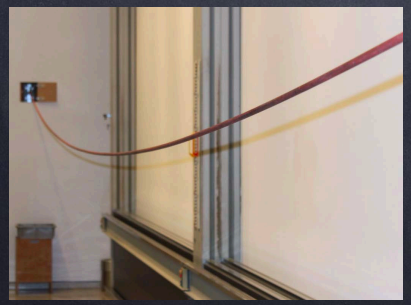
(a) Time $t = 0$.



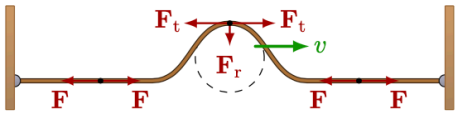
(b) Time $t = \Delta t$.

Figure 13.10: A traveling longitudinal wave is when the distortion happens along the direction of propagation, here shown as a local displacement.

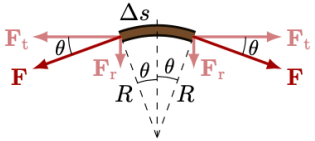




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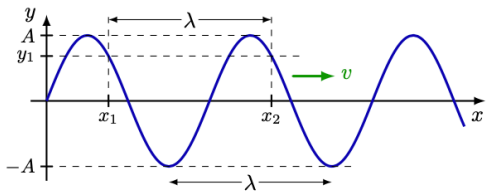


(a) Forces on a string. All across the string, there is a constant tension **F**.

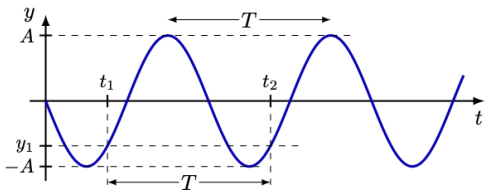


(b) Small segment of length Δs experiences a tension **F** on either side.

Figure 13.3: The tension in a string is increased due to a disturbance.

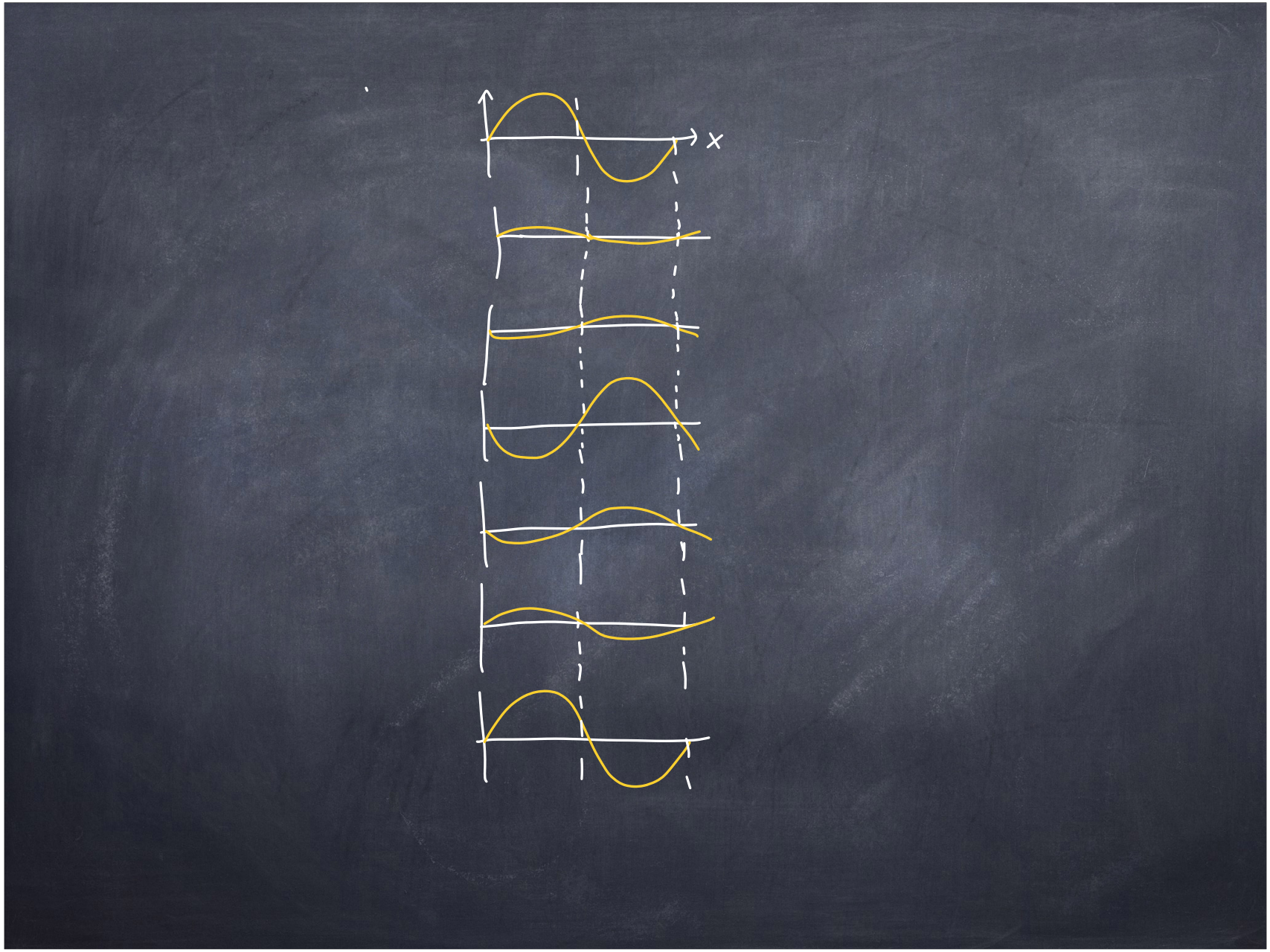


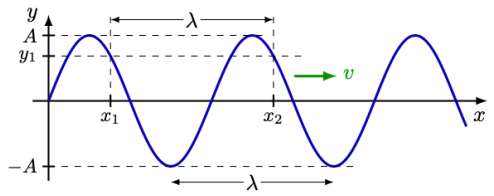
(a) Whole wave in space at time $t = 0$, given by $y(x, 0) = A\sin(kx)$.



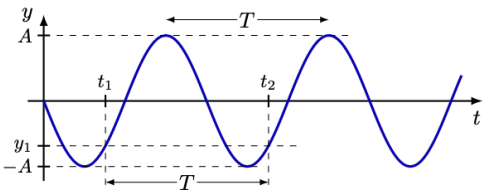
(b) Local disturbance at position $x = 0$, given by $y(0, t) = -A\sin(\omega t)$.

Figure 13.2: A space and time slice of a travelling sine wave $y(x, t) = A\sin(kx - \omega t)$.


x

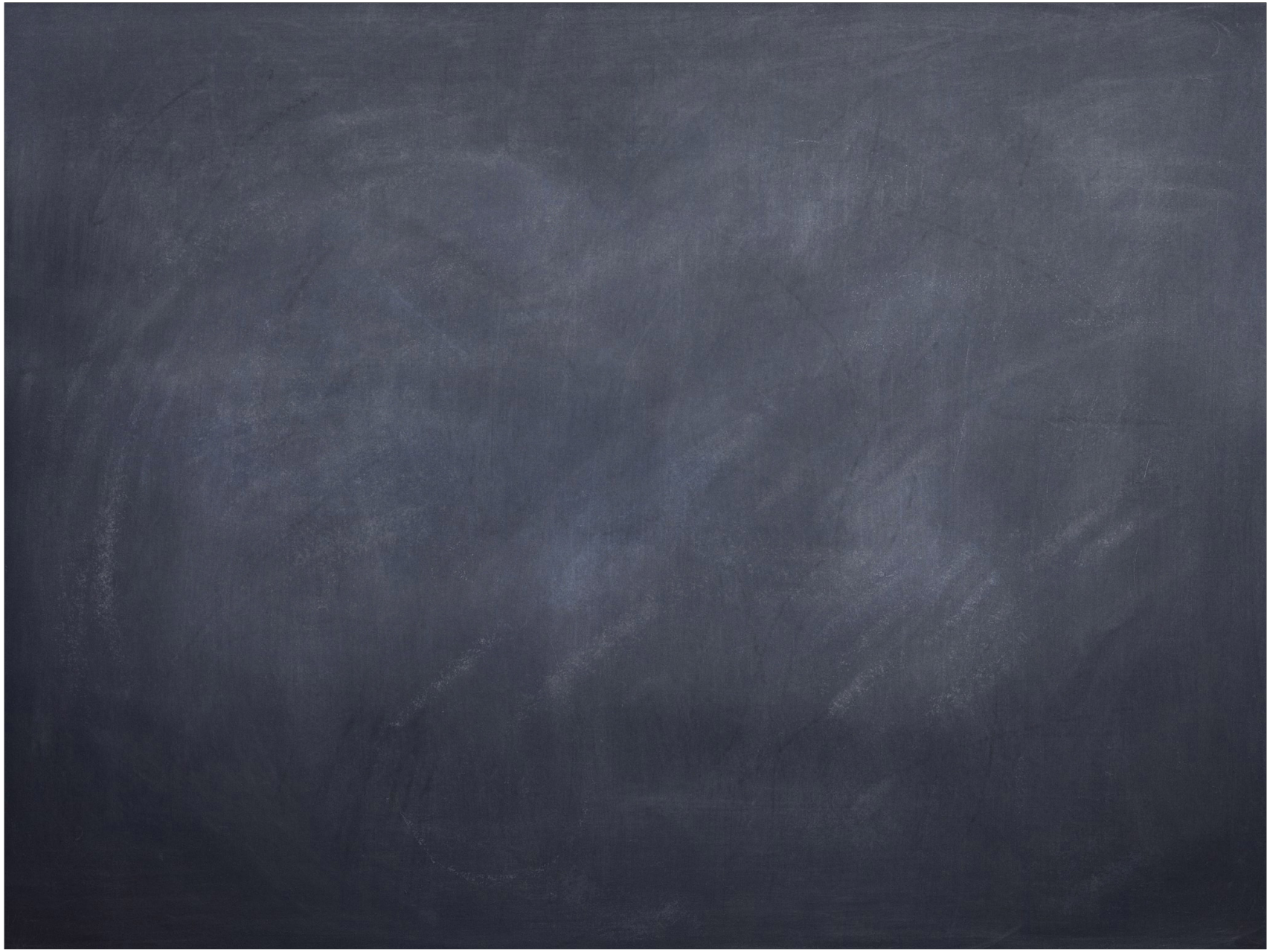


(a) Whole wave in space at time $t = 0$, given by $y(x, 0) = A\sin(kx)$.



(b) Local disturbance at position $x = 0$, given by $y(0, t) = -A\sin(\omega t)$.

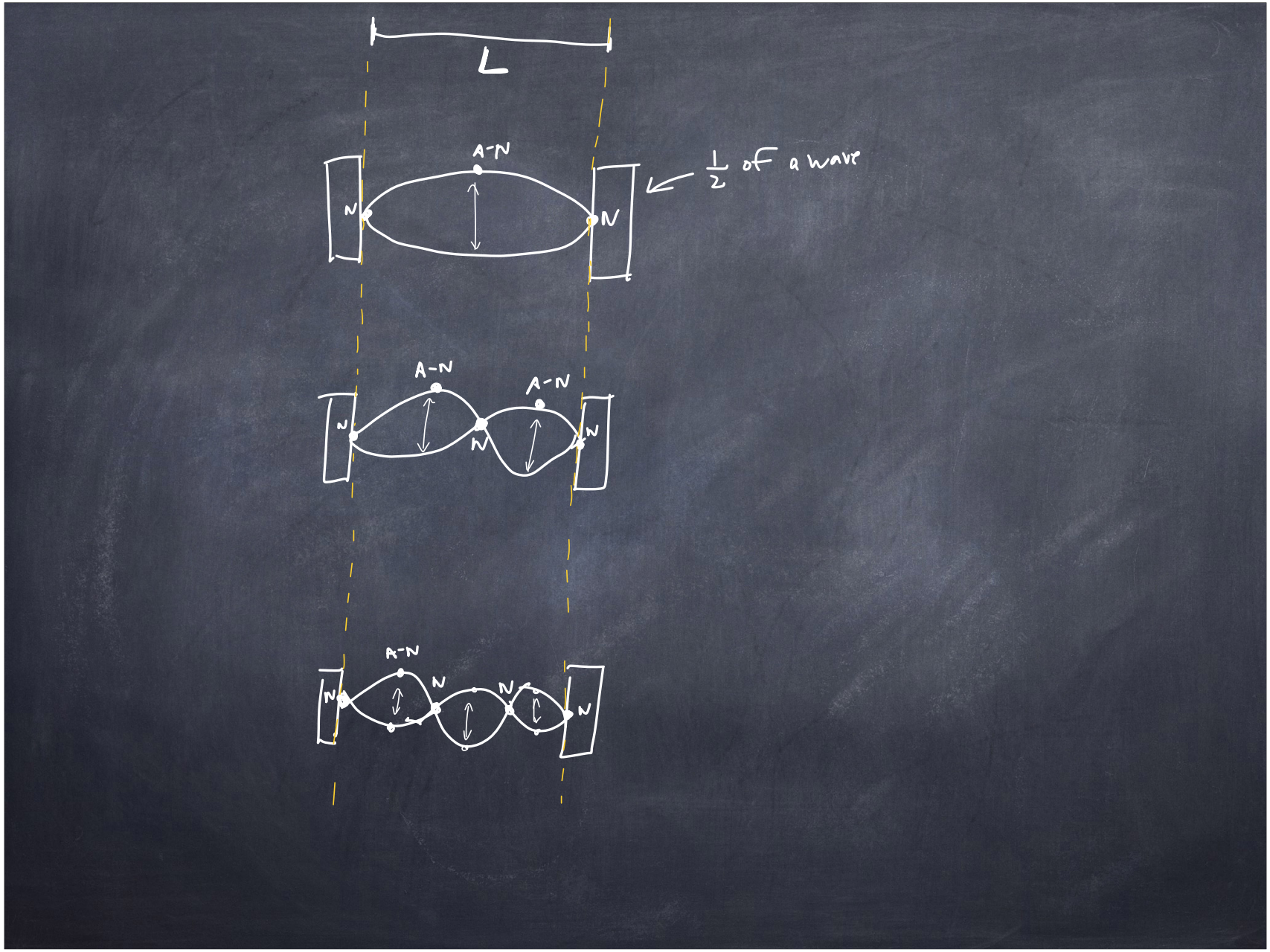
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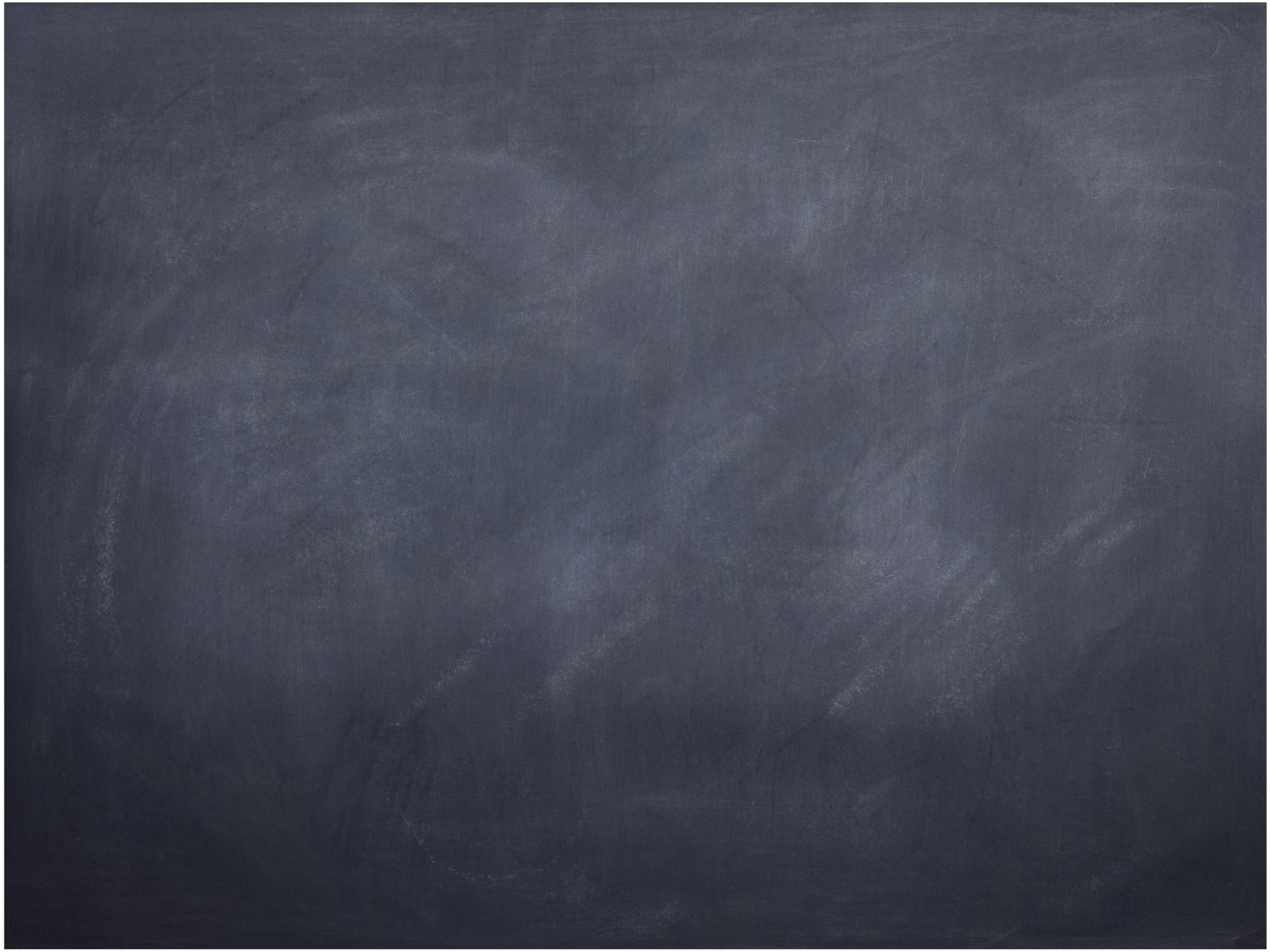


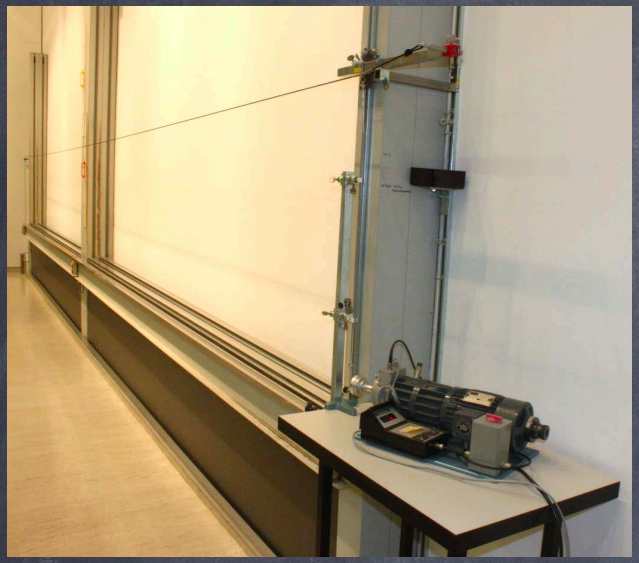
WAVE EQUATION

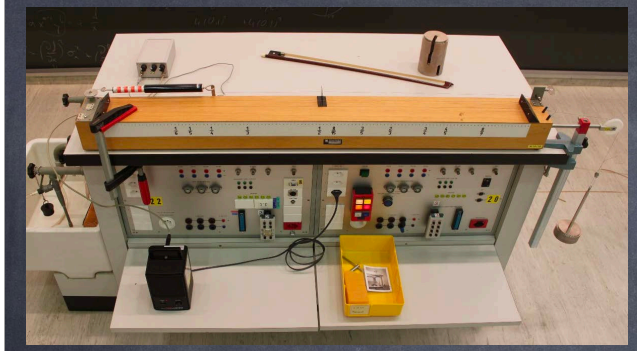
STANDING WAVES




L
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A-N
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A-N
N
N
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N

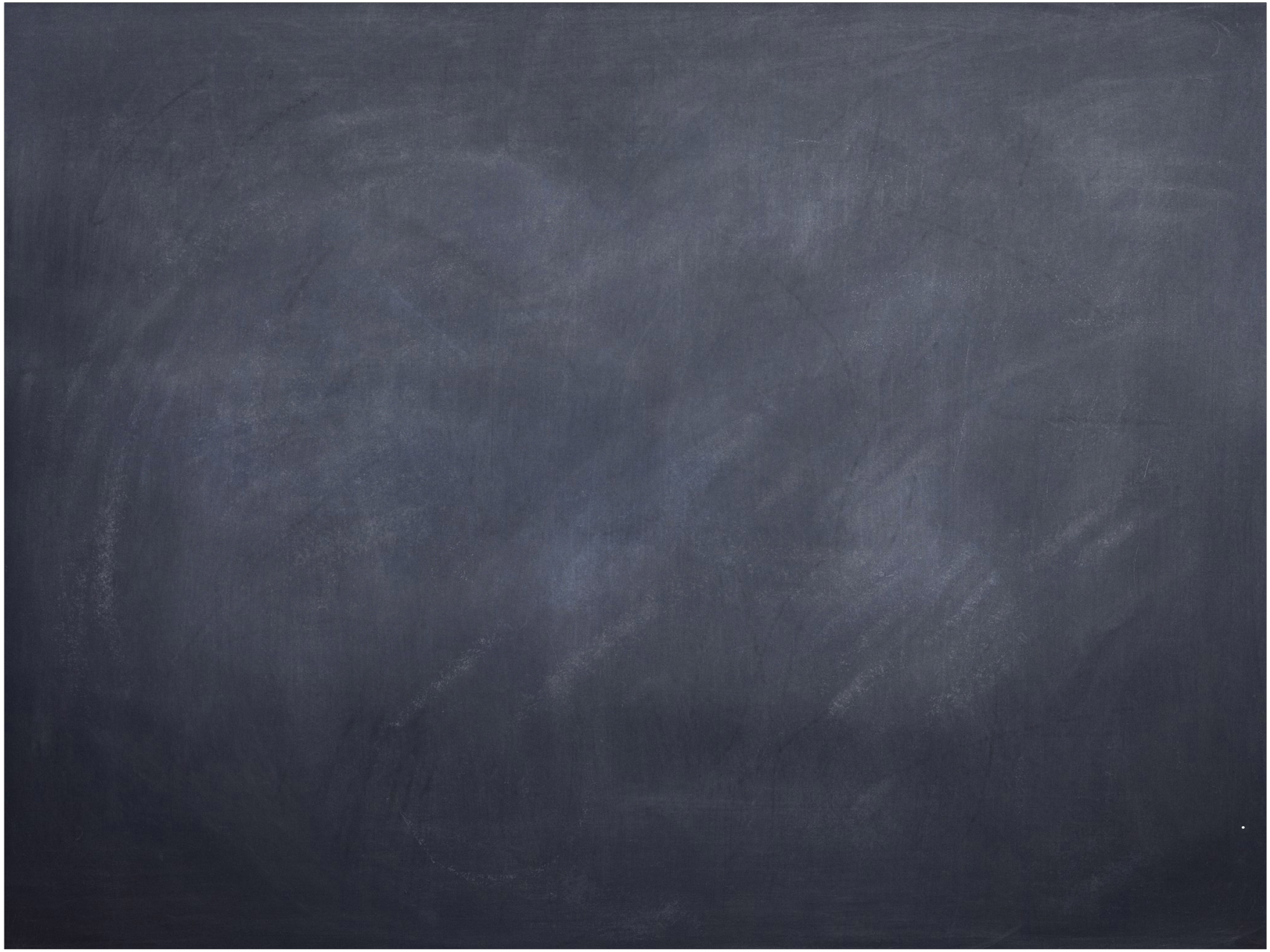


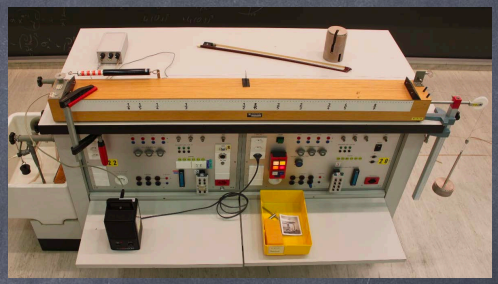




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STANDING WAVE FUNCTIONS

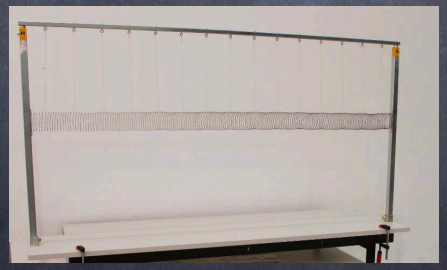




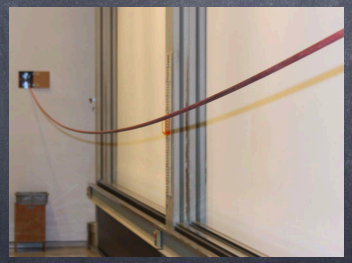
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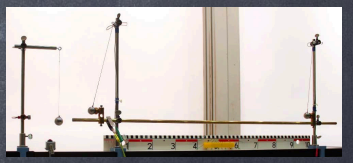
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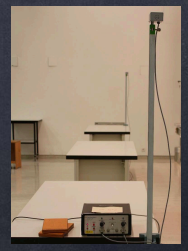
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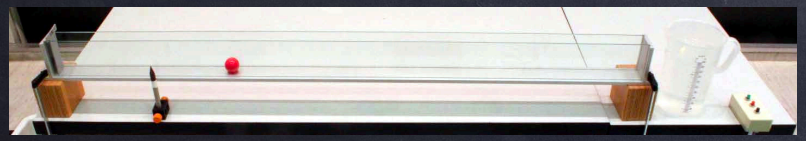
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W32



W33



W31