

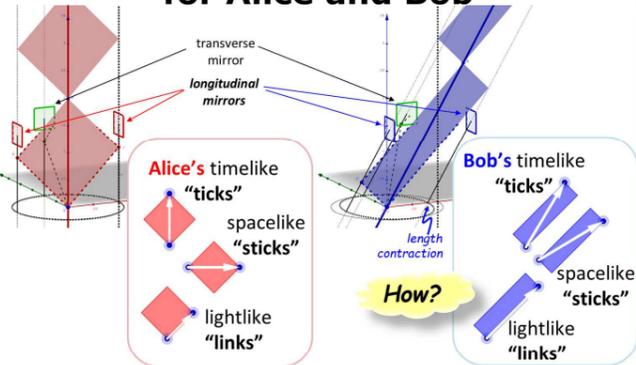
# Relativity on Rotated Graph Paper

# robphy

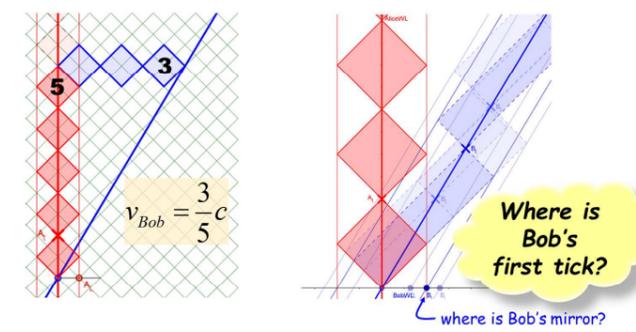
- Visualizing Time and Space with "Light Clock Diamonds" on a Spacetime Diagram drawn on **Rotated Graph Paper**

- Standard Textbook Problems done by **Stacking and Counting Diamonds** and doing simple algebra

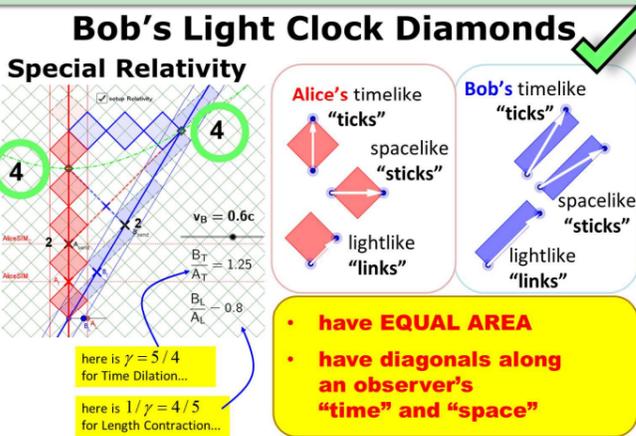
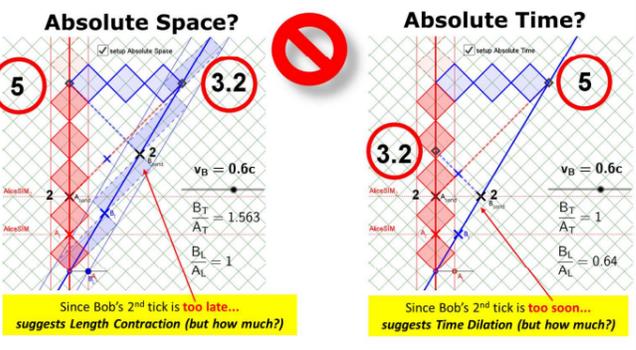
## Longitudinal Light Clock Diamonds for Alice and Bob



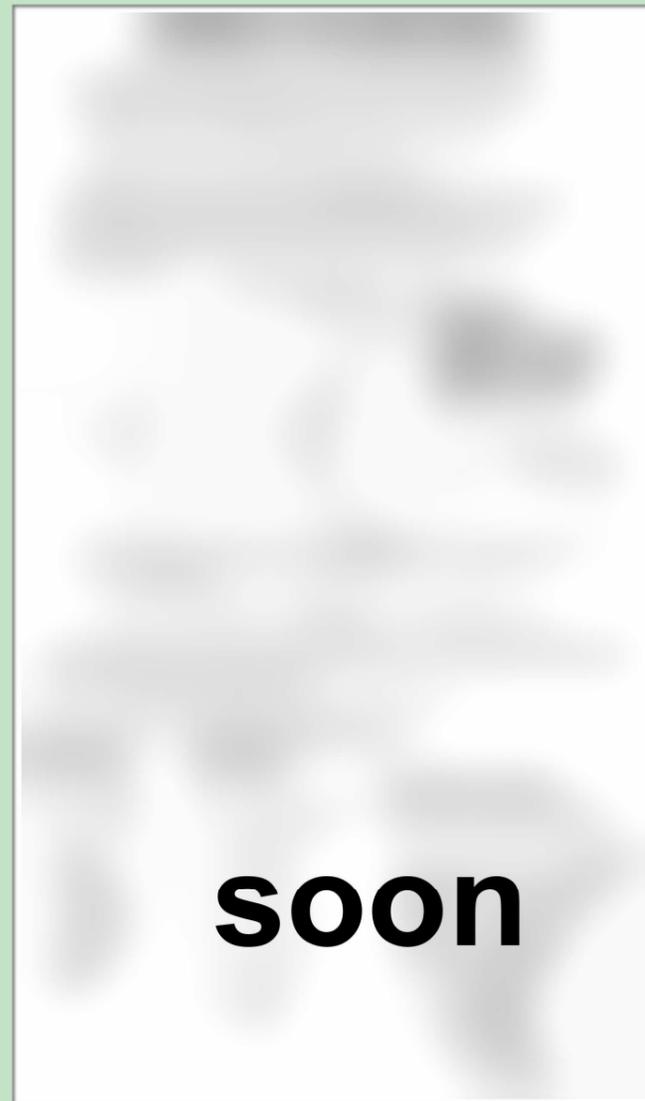
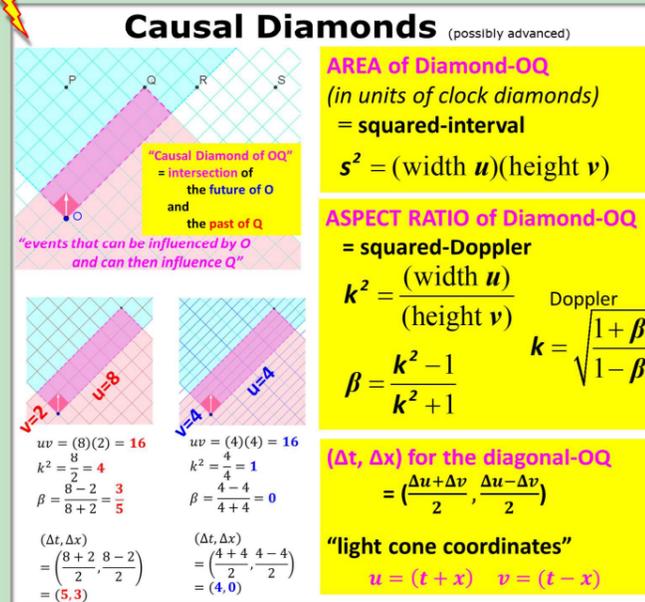
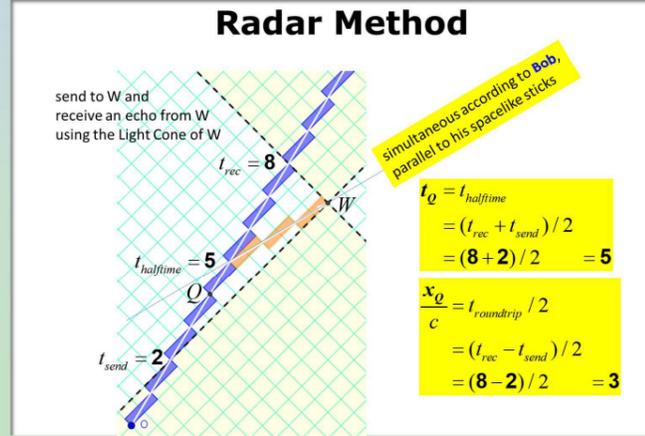
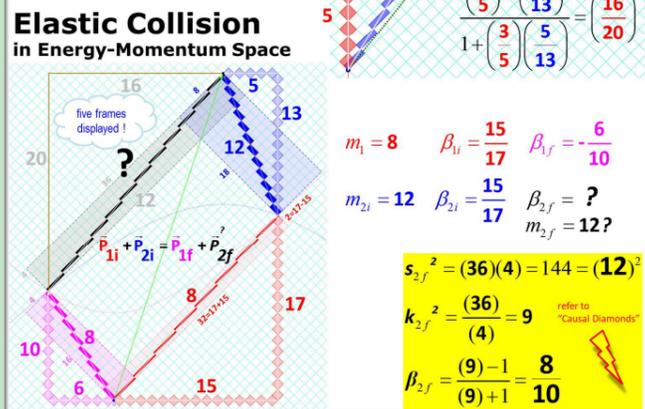
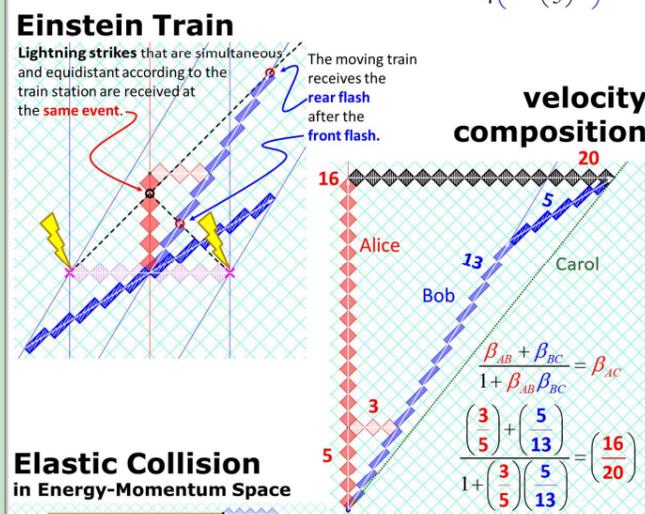
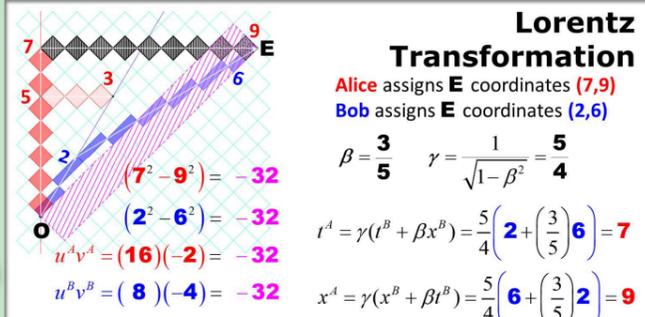
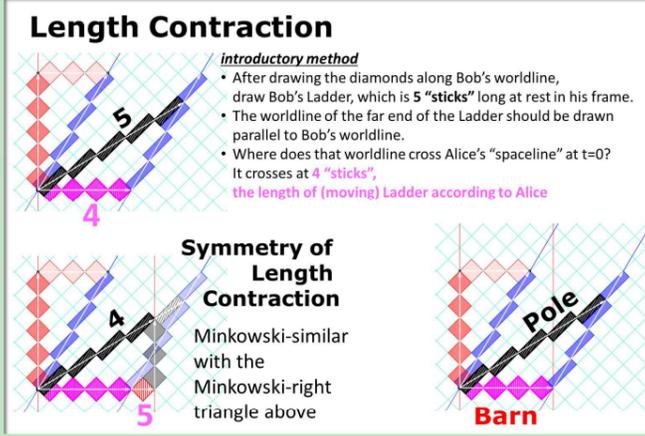
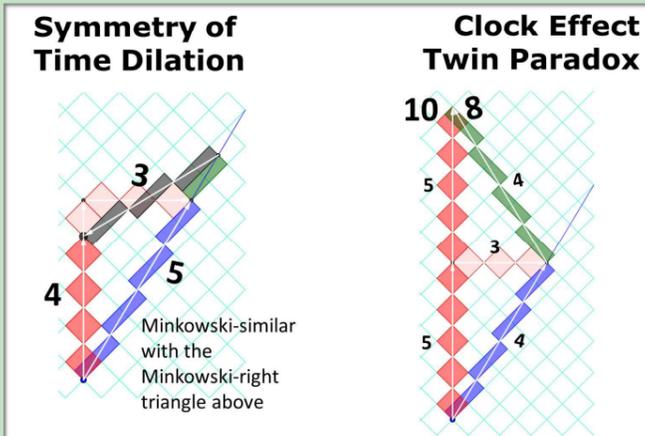
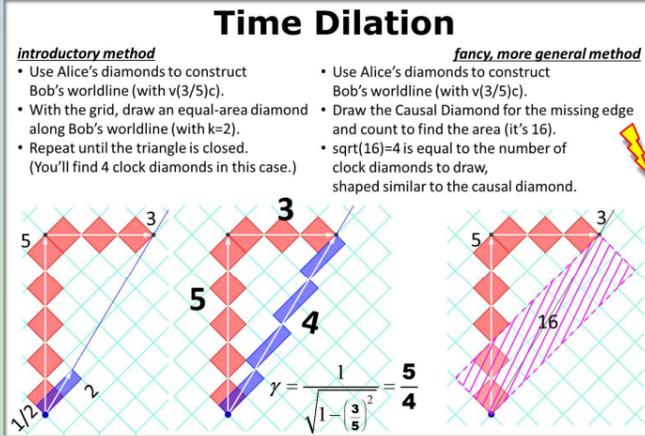
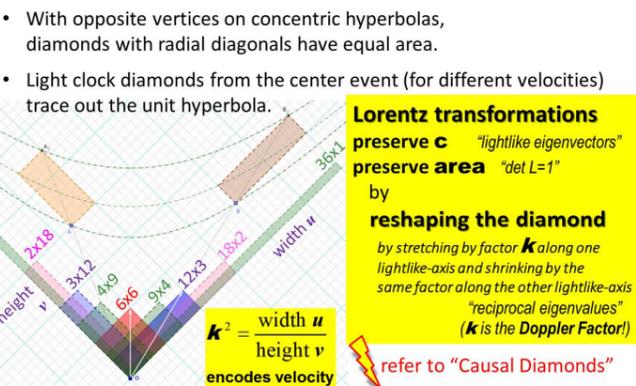
## Calibrating Bob's Light Clock according to Relativity?



"After 2 ticks, send a light signal to the other." Assuming the Speed of Light is independent of the source and the **Principle of Relativity** (expecting **identical outcomes**) ...



## Hyperbolas without Hyperbolas



**Readings and Resources**

- Salgado, R.B., "Relativity on rotated graph paper", Am. J. Phys. 84, 344 (2016)
- Salgado, R.B., "Visualizing proper-time in Special Relativity", Physics Teacher (Indian Physical Society), 46(4), 132-143 (2004) <http://arxiv.org/abs/physics/0505134>
- Salgado, R.B. and Schwertfeger, G.F. (in preparation)
- Mermin, N.D., "An introduction to space-time diagrams", Am. J. Phys., 65, 476-486 (1997)
- Mermin, N.D., "Space time intervals as light rectangles", Am. J. Phys., 66, 1077-1080 (1998)
- Bondi, H., Relativity and Common Sense (Dover, New York, 1962)
- Geroch, R.P., General Relativity from A to B (U. Chicago Press, 1978)
- Taylor, E.F., Wheeler, J.A. Spacetime Physics (W.H. Freeman, 1966)
- <https://www.physicsforums.com/insights/relativity-rotated-graph-paper/>
- <https://www.geogebra.org/m/HYD7hB9v#>