

CSAAPT Spring 2022 Semi-Virtual Meeting



Chesapeake Section of the
American Association of Physics Teachers
Spring 2022 Semi-Virtual Meeting
April 2, 2022 @ **RADFORD** UNIVERSITY

Contribution ID: 16

Type: **Talk**

Relativistic Doppler Shift And the Measurement of ct, x

Saturday, April 2, 2022 9:45 AM (15 minutes)

This presentation demonstrates the role light must always play in locating a moving emitter on our “ruler” of fixed locations. This emission must be observed, and from that observation the measurement of the event located at x at time ct . Normally, the event, its observation in another reference frame, and its measurement differ by such a minute amount that this is trivial. However, if the emitter is moving at a significant fraction of the speed of light, Doppler affects the time of observation and the resulting measurement. Thus, the time of the measurement is advanced in the observer’s reference frame, causing the observer to believe the emitter’s clock is running slower. This understanding, demonstrated using a modified Brehme diagram, considerably aids in the understanding of time dilation and length contraction as a Doppler effect on the observer’s measurement of the emitter, rather than some change in the emitter’s rulers and clock.

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Session Classification: Morning Session 2