

<http://www.phys.unsw.edu.au/einsteinlight/>

Einstein's theory of special relativity includes electricity and magnetism in a simple, logical extension of the relativity of Galileo and Newton. Its conclusions, including time dilation, length contraction, and $E=mc^2$ have changed profoundly our ideas of time and space, matter and energy.

These multimedia modules (**click on menu above right**) give a brief overview of relativity - they present the main ideas. Inevitably, you will have questions. So the related links (below) give more complete explanations, at levels with (Ⓢ) or without mathematics (Ⓜ).

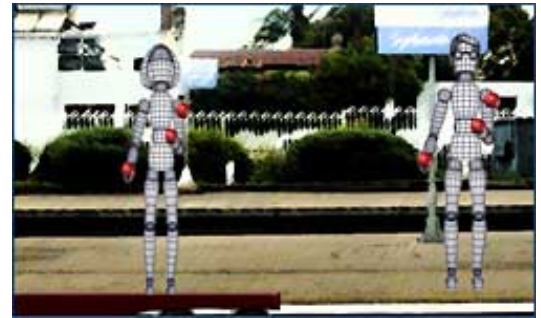
Animations from Einstein Light require the [Flash 6 Plugin](#). The multimedia modules have animations and film clips and are typically 2Mb. The much smaller HTML versions have only text and images. (If your connection is slow, you might read some of the background links while the modules load.)

Related Links for each module:-

1. GALILEO - Mechanics and Galilean relativity (Multimedia [above right](#), smaller html version [here](#))

Related Links

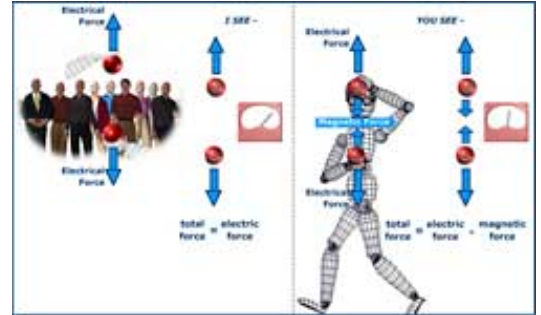
- [Do I need to know this? What will I learn?](#)
- [An introduction to the mechanics of Galileo and Newton](#)
- [Inertial frames and why the laws are the same in the train and on the platform](#)
- [The original references, and some caveats and conventions.](#)



2. MAXWELL - Electricity, magnetism and relativity (Multimedia [above right](#), smaller html version [here](#))

Related Links

- [A little background to electricity and magnetism](#)
- [Electricity and magnetism in a moving frame: what would you expect?](#)
- [Electricity and magnetism in a moving frame: an electric circuit example](#)
- [The electric and magnetic forces between moving charges](#)



3. EINSTEIN - The principle of Special Relativity (Multimedia [above right](#), smaller html version [here](#))

Related Links

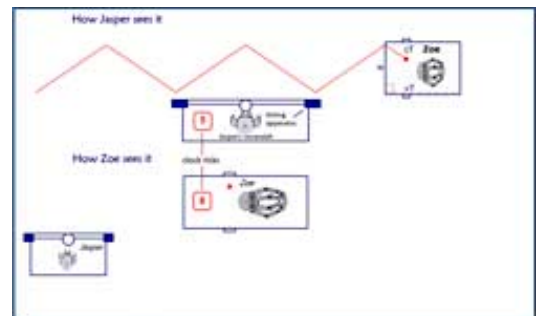
- [Relative to what? What is stationary? The æther?](#)
- [The weirdness - and the logic - of the invariance of the speed of light](#)
- [Why Einstein's relativity is an obvious extension of Galileo's](#)
- [Maxwell's equations: are they really so beautiful that you would dump Newton?](#)
- [But is it true? Is the speed of light really independent of the motion of the observer?](#)
- [More about the Michelson-Morley experiments.](#)





4. TIME DILATION - How relativity implies time dilation and length contraction (Multimedia [above right](#), smaller html version [here](#))

Related Links

- [More about time dilation](#)
- [Is time dilation true? How big are the effects?](#)
- [More about simultaneity, and the limits to time order reversals.](#)
- [More about length contraction](#)
- [The symmetry of time dilation paradoxical? The twin paradox.](#)









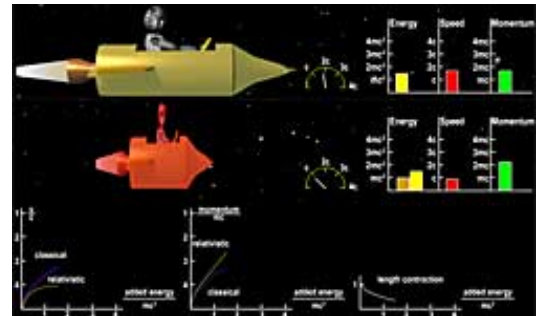
- [Is the symmetry of length contraction paradoxical? The pole paradox.](#) 
- [Lorentz transforms, the addition of velocities and spacetime](#) 

5. $E = mc^2$ - How relativistic mechanics leads to $E = mc^2$

(Multimedia [above right](#), smaller html version [here](#))




Related Links

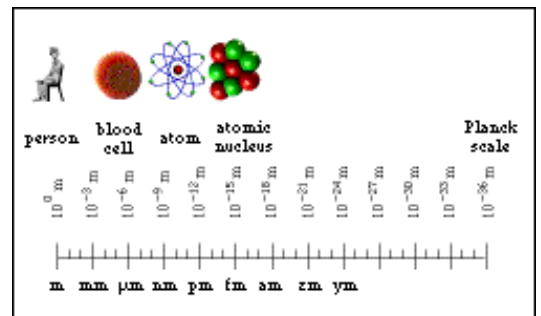
- [What do those energy equations mean, and where did they come from?](#) 
- [Energy in Newtonian mechanics and in relativity](#) 
- [\$E = mc^2\$ and binding energies in the nucleus \(and in molecules.\)](#) 
- [Why there would be no chemistry without relativity](#) 
- [Practical devices using relativity](#) 
- [\$E = mc^2\$: is it true?](#) 



6. BEYOND RELATIVITY. (Multimedia version, or smaller html version)

Related Links

- [Relativity and quantum mechanics meet \(crash into?\) gravity](#) 
- [Possible variations in the laws of nature](#) 
- [Other directions](#) 



Summary

[Acknowledgments and credits](#)

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