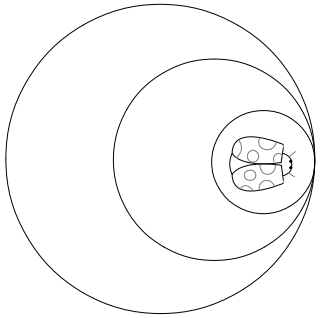
Bow Waves and Shock Waves

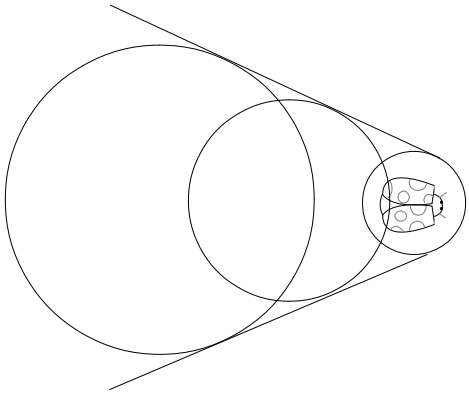
When a wave source is moving as fast as the speed of the waves it creates, the waves pile up in front of it.

Example: A bug producing ripples on water, moving as fast as the waves (lines represent crests)



bug is moving to the right

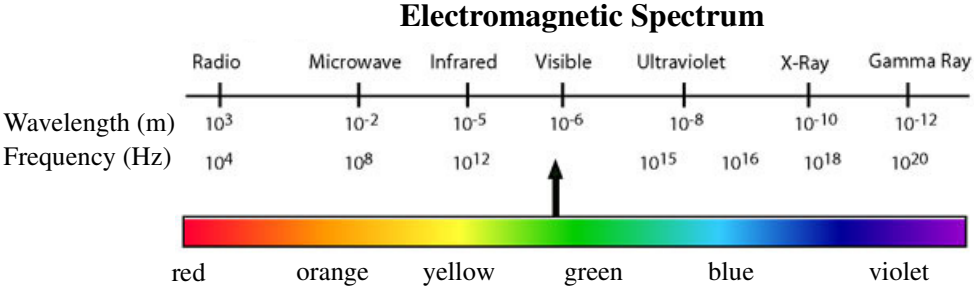
If the source goes faster than the wave speed, a *bow* wave is produced by all the overlapping wave crests.



An object moving faster than the speed of *sound* (e.g. a jet) will produce an air *shock* wave as a result of overlapping compressions. This wave sounds like a bang when it reaches our ears.

Electromagnetic waves

Electric and magnetic fields can propagate waves, just like air or water. However, we don't usually see or hear electromagnetic waves, since we can't see or hear electric or magnetic fields. We can see a range of frequencies of electromagnetic waves, but the rest have different purposes.



Visible light only takes up a tiny part of the whole electromagnetic spectrum

The speed of waves in electric and magnetic fields is incredibly fast ($3x10^{8}$ ms^{-1}) which is why it seems to us like light reaches our eyes instantly.
Just like we hear different frequencies of sound as pitch (higher frequencies give higher notes), we see visible light frequencies as colour (as shown above). Higher frequency waves have more energy.