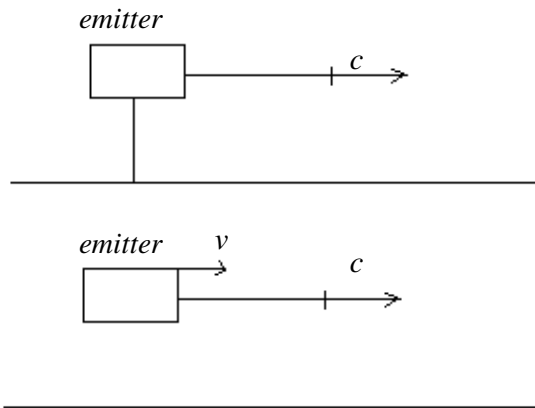


## Difference Between Particles and Waves

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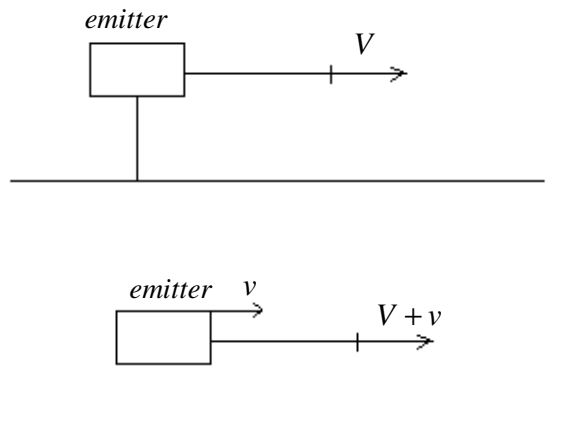
Waves have spin 1, particles have spin  $\frac{1}{2}$ .  
But how can we prove this?

For waves, the speed of the emitter do not sums to the speed of the wave:



One complete wave carries a quantum of energy.  
The photon is not a particle.

For particles, the speed of the emitter sums to the speed of the particle:



The particles emit a field of longitudinal waves.