Answer on Question #83694, Physics / Electromagnetism

Question:

Can the following quantities be measured or calculated for light waves and subatomic particles, why or why not ?

Momentum:
Velocity:
Frequency:
Energy:

Solution:

Energy: sure can, for both subatomic particles and light particles, named photons; the energy value is $E = mc^2$, where m – mass of a particle.

Frequency: this parameter is applied for light or photons, in the last case the frequency can be calculated as $\nu = \frac{E}{h}$, h – Plank constant. For subatomic particles this term normally isn't used, although a wavelength is often used, so called de Broil wavelength.

Velocity: obviously can in both cases, although for subatomic particles there are some restrictions associated with Heisenberg uncertainty principle.

Momentum: it can be measured or calculated both for photons and particle by mean of well-known relation p = mv, where m is the actual mass and v – the velocity; all photons have the same velocity c in vacuum.

The answer:
Please see above.