What happens, when an electromagnetic wave passes an electron?

These findings aren't new, see: https://en.wikipedia.org/wiki/Refractive_index#Microscopic_explanation

For an electromagnetic wave it is known, that the E Field is perpendicular to the velocity vector of the wave and the magnetic B-Field is perpendicular to the E Field and both are perpendicular to the velocity vector.

Given:

- x: direction of the electromagnetic E field of the electromagnetic wave
- y: direction of the electromagnetic B field of the electromagnetic wave
- z direction of the propagation of the electromagnetic wave
- view point is at the electron e that sits at x=y=z=0 and will be moved only by the passing electromagnetic wave. E.g. The electron does not know how the passing wave was created, either it was in an inertial system with a relative speed of 0 (then the frequency the electron experiences f0 is identical with the generated frequency, or if it was generated by an approaching object with relative speed v1. Then the frequency for the electron seems to be higher than f0 according the known frequency shift.

Theory:

The wave passing the electron will accelerated the electron due to its E-field in x-direction. The electron hereby gains velocity in x direction. This velocity is perpendicular to the B-field (B only in y-direction), which then causes the Lorentz force on the electron in z direction.

Alltogether an electron moves in a small elliptical circle in the z-x plane, thus forming a dipole antenna (similar to the Hertz-Dipole) which reemits the part of the energy the electron took from the wave.

A simple geometric analysis shows, that the electron is always moving perpendicular to the B field of the wave, against the propagation vector of the wave, before moving back to its original place. This small difference in the position, which is always 'backwards', thus emits the new wave at a slightly 'backwards' position which could be responsible for smaller propagation speeds of light in different materials.

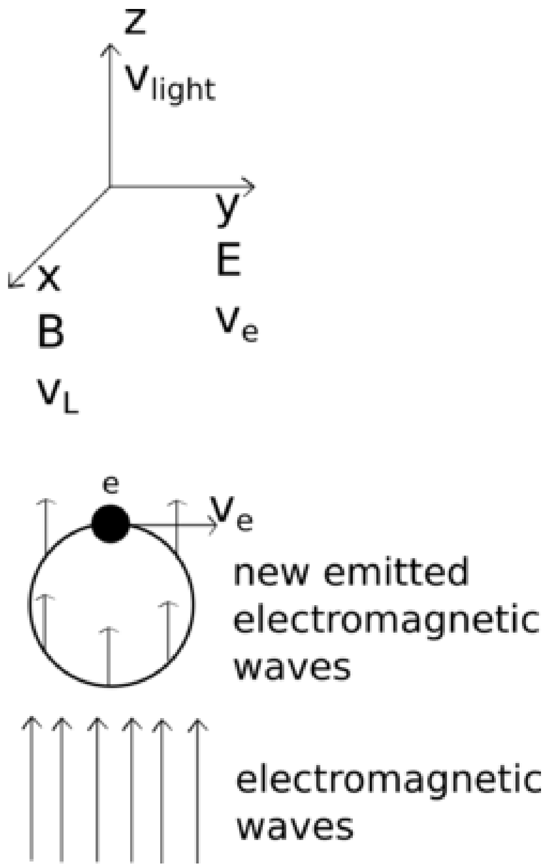

Figure 1

Result:

- this explains why light moves at different speeds in different materials
- this explains why light gets reemitted at reflection as well as interference with electrons with the speed of c relative to the speed of the interfering electron
- this explains the "De Sitter double star experiment"
- this explains the 180 degree phase-shift upon reflection