

So, $S(E_x - E'_x) = 0$
 $\therefore E_x = E'_x$

This shows that value of x-component of electric field does not change with time. So electric field along x-axis is static. So electric field cannot propagate the wave. Hence, electric field parallel to the direction of propagation of the wave is zero.

$E_x - E'_x = 0$

It means electric field is perpendicular to the direction of propagation of wave.

Similarly, it can be proved that magnetic field is also perpendicular to the direction of propagation of wave. This means electromagnetic waves are transverse in nature.

Electromagnetic Spectrum + The sequential arrangement of a wave pattern according to its frequency or wavelength called spectrum of wave.

NAME	Frequency (Hz)	Wavelength (meter)
γ-rays	3×10^{19} to 5×10^{20}	6×10^{-13} to 10^{-11}
X-rays	10^{16} to 3×10^{19}	10^{-11} to 3×10^{-8}
U.V rays	8×10^{14} to 8×10^{16}	4×10^{-9} to 4×10^{-7}
Visible light	4×10^{14} to 8×10^{14}	4×10^{-7} to 8×10^{-7}
Infrared (IR)	3×10^{11} to 4×10^{14}	8×10^{-9} to 3×10^{-3}
Micro waves	3×10^8 to 3×10^{11}	10^{-3} to 1
Radio Waves	3×10^3 to 3×10^{11}	10^{-3} to 10^5

Decreasing

Increasing