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Paper-01 Sem-II
MJC-PHYSICS

LIGHT AS EM WAVE

[Light as EM (Electromagnetic) wave] ——→: James clerk Maxwell theorized in the 1860–1870, that light was a wave composed of oscillating mutually perpendicular electric and magnetic fields, capable of traveling through a vacuum. In starting before the 1800s Newton believed that light was a particle, while thomas young's experiments in the early 1800s confirmed that light was a wave.

In 1845 michael faraday discovered magnetic fields could change the polarization of light, which led to the connection between light and ~~electromagnetism~~ magnetism. James clerk maxwell was developed the mathematical theory of electromagnetic waves. He concluded that light is an electromagnetic wave that 3×10^8 m/s travels ~~through~~ in speed of vacuum. Later Heinrich Hertz in 1888 experimentally proved electromagnetic waves. ~~Here~~ In 1900 Max planck explained Black body radiation In 1926 Gilbert N. Lewis named these (Compton scattering) light quanta particle photons. Eventually quantum mechanics came to picture light as (in some

sence) both a particle and wave and (in another sence) as phenomenon which is neither a particle nor a wave (which actually are microscopic phenomena, such as Ocean waves).

In 1924 - 1925, Satyendra Nath Bose showed light followed different statics from that of classical particles. With Einstein, they generalized this result for a whole set of integer spin particles called bosons (after Bose) that follow Bose einstein Statistics. The photon is 'massless' boson of spin 1.

In 1927 paul Dirac quantized the electromagnetic field. 1960s to gain a more detailed understanding of photodetection and the statistics of light (degree of coherence). This led to the introduction of the Coherent state. In 1977 H. Jeff Kimble demonstrated a single atom emitting one photon at a time, further compelling evidence that light consists of light with characteristics unlike classical states such as squeezed light were subsequently discovered.