

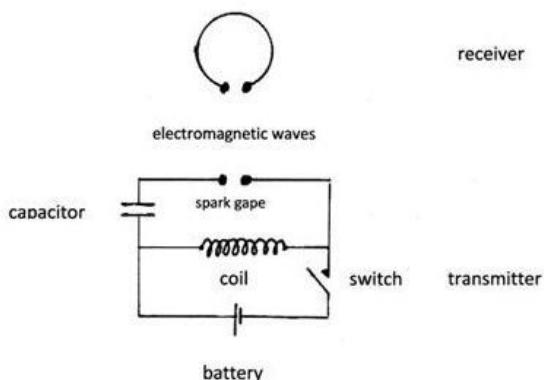
WHICH EXPERIMENT CONFIRMS THE ELECTROMAGNETIC NATURE OF LIGHT?
GIVE SOME DETAILED DESCRIPTION OF IT.

Answer

The electromagnetic nature of light was confirmed experimentally with the discovery of radio waves by Heinrich Hertz in 1886.

For his radio wave transmitter he used a high voltage induction coil, a condenser (capacitor, Leyden jar) and a spark gap - whose poles on either side are formed by spheres of 2 cm radius - to cause a spark discharge between the spark gap's poles oscillating at a frequency determined by the values of the capacitor and the induction coil.

To prove there really was radiation emitted, it had to be detected. Hertz used a piece of copper wire, 1 mm thick, bent into a circle of a diameter of 7.5 cm, with a small brass sphere on one end, and the other end of the wire was pointed, with the point near the sphere. He added a screw mechanism so that the point could be moved very close to the sphere in a controlled fashion. This "receiver" was designed so that current oscillating back and forth in the wire would have a natural period close to that of the "transmitter" described above. The presence of oscillating charge in the receiver would be signaled by sparks across the (tiny) gap between the point and the sphere (typically, this gap was hundredths of a millimeter).



Conceptual Schematic of Hertz's Experiment.

In this experiment Hertz confirmed Maxwell's theories about the existence of electromagnetic radiation.

In more advanced experiments, Hertz measured the velocity of electromagnetic radiation and found it to be the same as the light's velocity. He also showed that the nature of radio waves' reflection and refraction was the same as those of light, and established beyond any doubt that light is a form of electromagnetic radiation obeying the Maxwell equations.