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Electrodynamics is the Physics of Electromagnetic Radiation and Electromagnetism

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Introduction

In physics, electromagnetic radiation EM radiation or EMR refers to the waves or their quanta, photons of the electromagnetic field, propagating through space, carrying electromagnetic radiant energy. It includes radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. All of these waves form part of the electromagnetic spectrum. Classically, electromagnetic radiation consists of electromagnetic waves, which are synchronized oscillations of electric and magnetic fields. Electromagnetic radiation or electromagnetic waves are created due to periodic change of electric or magnetic field. Depending on how this periodic change occurs and the power generated, different wavelengths of electromagnetic spectrum are produced. In a vacuum, electromagnetic waves travel at the speed of light, commonly denoted c. In homogeneous, isotropic media, the oscillations of the two fields are perpendicular to each other and perpendicular to the direction of energy and wave propagation, forming a transverse wave. The wave front of electromagnetic waves emitted from a point source such as a light bulb is a sphere. The position of an electromagnetic wave within the electromagnetic spectrum can be characterized by either its frequency of oscillation or its wavelength. Electromagnetic waves of different frequency are called by different names since they have different sources and effects on matter. In order of increasing frequency and decreasing wavelength these are radio waves, microwaves, infrared radiation, visible light, ultraviolet radiation, X-rays and gamma rays. Electrodynamics is the physics of electromagnetic radiation, and electromagnetism is the physical phenomenon associated with the theory of electrodynamics. Electric and magnetic fields obey the properties of superposition. Thus, a field due to any particular particle or time-varying electric or magnetic field contributes to the fields present in the same space due to other causes. Further, as they are vector fields, all magnetic and electric field vectors add together according to vector addition. For example, in optics two or more coherent light waves may interact and by constructive or destructive interference yield a resultant irradiance deviating from the sum of the component irradiances of the individual light waves. The electromagnetic fields of light are not affected by traveling through static electric or magnetic fields in a linear medium such as a vacuum. However, in nonlinear media, such as some crystals, interactions can occur between light and static electric and magnetic fields these interactions include the Faraday Effect and the Kerr effect. In refraction, a wave crossing from one medium to another of different density alters its speed and direction upon entering the new medium. The ratio of the refractive indices of the media determines the degree of refraction, and is summarized by Snell's law. Light of composite wavelengths natural sunlight disperses into a visible spectrum passing through a prism, because of the wavelength-dependent refractive index of the prism material dispersion; that is, each component wave within the composite light is bent a different .In order of increasing frequency and decreasing wavelength these are radio waves, microwaves, infrared radiation, visible light, ultraviolet radiation, X-rays and gamma rays. Electrodynamics is the physics of electromagnetic radiation, and electromagnetism is the physical phenomenon amount. It includes radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. The position of an electromagnetic wave within the electromagnetic spectrum can be characterized by either its frequency of oscillation or its wavelength. Electromagnetic waves of different frequency are called by different names since they have different sources and effects on matter. In order of increasing frequency and decreasing wavelength these are radio waves, microwaves, infrared radiation, visible light, ultraviolet radiation, X-rays and gamma rays. Electrodynamics is the physics of electromagnetic radiation, and electromagnetism is the physical phenomenon associated with the theory of electrodynamics.

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