



ELECTRICAL PHENOMENA IN PHYSICS

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Annotation: Lightning and human-made electric lights are some of the most dramatic effects of electricity. Lightning is a natural phenomenon formed by electrostatic discharges through the atmosphere between two electrically charged regions, either both in the atmosphere or one in the atmosphere and one on the ground, temporarily neutralizing these in a near-instantaneous release of an average of between 200 megajoules and 7 gigajoules of energy, depending on the type.

Key words: Electricity, static electricity, electric heating, electric discharges, lightning, astraphobia.

Аннотация: Молния и искусственное электрическое освещение - одни из самых драматичных эффектов электричества. Молния - это природное явление, образующееся в результате электростатических разрядов в атмосфере между двумя электрически заряженными областями, либо в атмосфере, либо в атмосфере и на земле, которые временно нейтрализуются при почти мгновенном высвобождении в среднем от 200 мегаджоулей до 7 гигаджоулей энергии, в зависимости от типа молнии.

Ключевые слова: электричество, статическое электричество, электронагрев, электрические разряды, молния, астрафобия.

Annotatsiya: Chaqmoq va inson tomonidan ishlab chiqarilgan elektr, elektr energiyasining eng dramatik ta'siridan biridir. Chaqmoq tabiiy hodisa bo'lib, u hosil qilingan elektrostatik chiqindilar orqali atmosfera ikkala elektr zaryadlangan mintaqa o'rtasida ham atmosferada va bitta yerda hosil bo'lishi mumkin, ulardagi kuch o'rtacha 200 megajoul va 7 gigajoulni tashkil qiladi, energiya turiga qarab.

Kalit so'zlar: elektr, statik elektr, elektr isitish, elektr razryadlari, chaqmoq, astrafobiya.

Electricity is the set of physical phenomena associated with the presence and motion of matter possessing an electric charge. Electricity is related to magnetism, both being part of the phenomenon of electromagnetism, as described by Maxwell's equations. Common phenomena are related to electricity, including lightning, static electricity, electric heating, electric discharges and many others.

Lightning and human-made electric lights are some of the most dramatic effects of electricity. Digital cameras used to capture images like this one also use electricity from batteries, and human thought is electric in nature.



Lightning is a natural phenomenon formed by electrostatic discharges through the atmosphere between two electrically charged regions, either both in the atmosphere or one in the atmosphere and one on the ground, temporarily neutralizing these in a near-instantaneous release of an average of between 200 megajoules and 7 gigajoules of energy, depending on the type. This discharge may produce a wide range of electromagnetic radiation, from heat created by the rapid movement of electrons, to brilliant flashes of visible light in the form of black-body radiation. Lightning causes thunder, a sound from the shock wave which develops as gases in the vicinity of the discharge experience a sudden increase in pressure. Lightning occurs commonly during thunderstorms as well as other types of energetic weather systems, but volcanic lightning can also occur during volcanic eruptions. Lightning is an atmospheric electrical phenomenon and contributes to the global atmospheric electrical circuit.

The three main kinds of lightning are distinguished by where they occur: either inside a single thundercloud (intra-cloud), between two clouds (cloud-to-cloud), or between a cloud and the ground (cloud-to-ground), in which case it is referred to as a lightning strike. Many other observational variants are recognized, including "heat lightning", which can be seen from a great distance but not heard; dry lightning, which can cause forest fires; and ball lightning, which is rarely observed scientifically.

Humans have deified lightning for millennia. Idiomatic expressions derived from lightning, such as the English expression "bolt from the blue", are common across languages. At all times people have been fascinated by the sight and difference of lightning. The fear of lightning is called astraphobia.

The first known photograph of lightning is from 1847, by Thomas Martin Easterly. The first surviving photograph is from 1882, by William Nicholson Jennings, a photographer who spent half his life capturing pictures of lightning and proving its diversity.

There is growing evidence that lightning activity is increased by particulate emissions). However, lightning may also improve air quality and clean greenhouse gases such as methane from the atmosphere, while creating nitrogen oxide and ozone at the same time. Lightning is also the major cause of wildfire, and wildfire can contribute to climate change as well. More studies are warranted to clarify their relationship.



The presence of either a positive or negative electric charge produces an electric field. The motion of electric charges is an electric current and produces a magnetic field. In most applications, Coulomb's law determines the force acting on an electric charge. Electric potential is the work done to move an electric charge from one point to another within an electric field, typically measured in volts.

Electricity plays a central role in many modern technologies, serving in electric power where electric current is used to energise equipment, and in electronics dealing with electrical circuits involving active components such as vacuum tubes, transistors, diodes and integrated circuits, and associated passive interconnection technologies.

The study of electrical phenomena dates back to antiquity, with theoretical understanding progressing slowly until the 17th and 18th centuries. The development of the theory of electromagnetism in the 19th century marked significant progress, leading to electricity's industrial and residential application by electrical engineers by the century's end. This rapid expansion in electrical technology at the time was the driving force for the Second Industrial Revolution, with electricity's versatility driving transformations in industry and society. Electricity is integral to applications spanning transport, heating, lighting, communications, and computation, making it the foundation of modern industrial society.

Long before any knowledge of electricity existed, people were aware of shocks from electric fish. Ancient Egyptian texts dating from 2750 BCE described them as the "protectors" of all other fish. Electric fish were again reported millennia later by ancient Greek, Roman and Arabic naturalists and physicians. Several ancient writers, such as Pliny the Elder and Scribonius Largus, attested to the numbing effect of electric shocks delivered by electric catfish and electric rays, and knew that such shocks could travel along conducting objects. Patients with ailments such as gout or headache were directed to touch electric fish in the hope that the powerful jolt might cure them.

Ancient cultures around the Mediterranean knew that certain objects, such as rods of amber, could be rubbed with cat's fur to attract light objects like feathers. Thales of Miletus made a series of observations on static electricity around 600 BCE, from which he believed that friction rendered amber magnetic, in contrast to minerals such as magnetite, which needed no rubbing. Thales was incorrect in believing the attraction was due to a magnetic effect, but later science would prove a link between magnetism and electricity. According to a controversial theory, the Parthians may have had knowledge of electroplating, based on the 1936 discovery of the Baghdad Battery, which resembles a galvanic cell, though it is uncertain whether the artifact was electrical in nature.

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