3rd Radiation Physics

Electromagnetism and Wireless Communication

Our daily environment is filled with objects and instruments that some of us handle with great dexterity: levers of all kinds, computers, phones and televisions, instruments indicating our position, telescopes, microscopes and machines that visualize the inside of our body. Yet few people, sometimes even among the specialist users of these tools, really know the origin of the concepts that underlie their operation. Indeed, the birth of the great principles of physics very often, if not always, takes place in circumstances totally unrelated to the context of their current application. In this presentation, we will examine the trajectory of some major physical concepts, from their original context to their use in an instrument known to most of us. We will voluntarily limit ourselves to the physical sciences and to instruments presented as "modern", complex in their operation, but considered indispensable in terms of services rendered. The first example mentioned concerns electromagnetism and the rise of radio communications at the beginning of the twentieth century. The following examples relate to the description of matter at the most fundamental level. It concerns the ultimate scales and requires a theoretical framework with unprecedented consequences: quantum mechanics.

The wave behavior of massive particles, introduced by Louis de Broglie, the introduction of spin as the intrinsic "quality" of particles and the existence of antimatter as a consequence of the Dirac equation, will lead to the possibility of probing and visualizing matter as never before without these entirely new concepts.

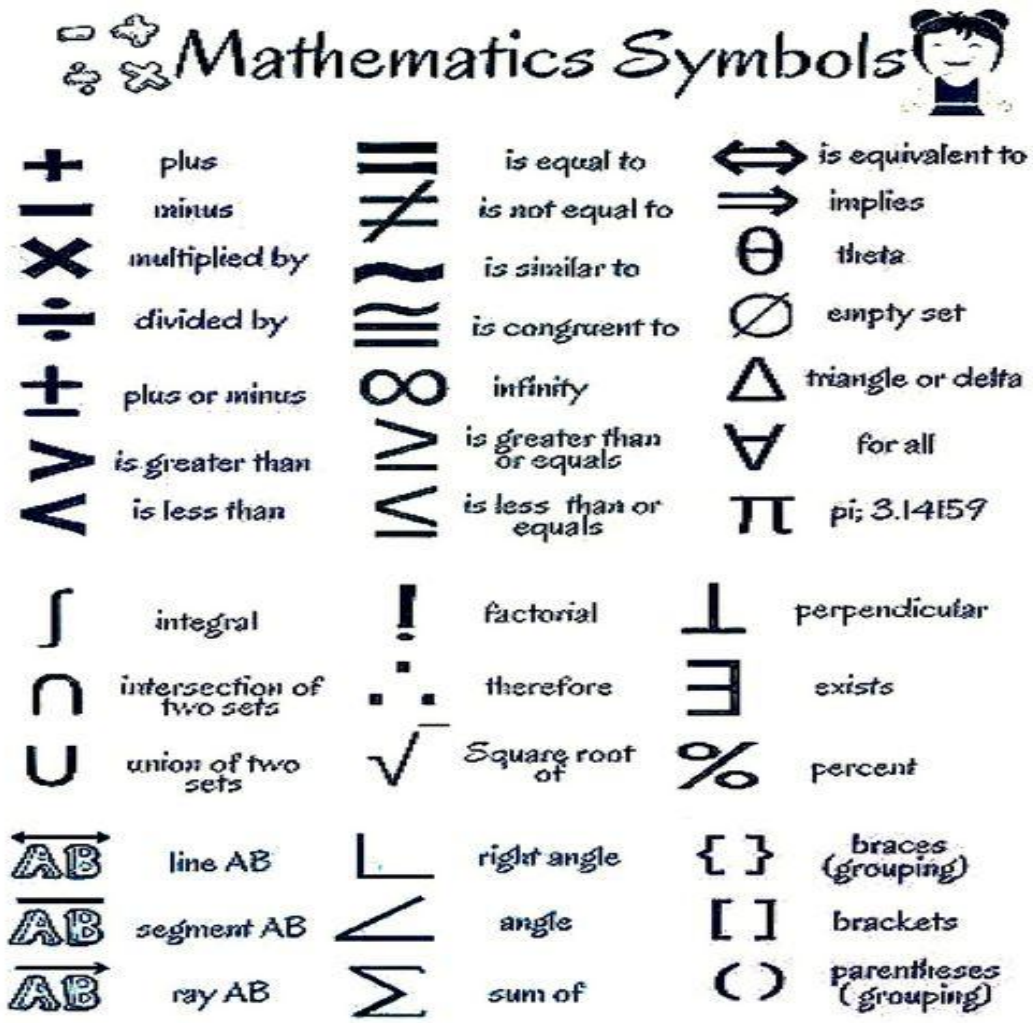
Finally, we will finish with the theories of special and general relativity that have changed the way we represent space and time, and then our description of gravitation.

Keywords: history of science and technology / electromagnetism / quantum mechanics / relativity.

English Grammer

Table 1 that physical quantities are one-to-one correspondence, and students can quickly grasp the key knowledge points of electromagnetism.

Electric field		Magnetic field	
Static charge	q	Velocity	$\vec{v}$
Electric field	$\vec{E}$	Magnetic field	$\vec{B}$
Electrostatic Force	$\vec{F}_{\mathrm{E}} = \mathrm{q}\,\vec{E}$	Magnetic force	$\vec{F}_{\mathrm{B}} = \mathrm{q}\,\vec{v} \times \vec{B}$



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