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| A colorful grid with lines  Description automatically generated with medium confidence |

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EM WAVE PROPAGATION

Modelling oscillation of charged particle

# Introduction

## Charged particle

A charged particle is a particle with an electric charge. Electric charge (q) is the physical property of mater that causes it to experience a force when placed in an electromagnetic field. Electric charge can be positive or negative (commonly carried by protons and electrons respectively, by convention). Like charges repel each other and unlike charges attract each other. An object with no net charge is referred to as electrically neutral.

Coulomb's law can be stated as a simple mathematical expression. The scalar form gives the magnitude of the vector of the electrostatic force F between two point charges q1 and q2, but not its direction. If r is the distance between the charges, the magnitude of the force is

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|  | Columb’s law: |  |

where ε0 is the electric constant. If the product q1q2 is positive, the force between the two charges is repulsive; if the product is negative, the force between them is attractive.

## Electric field

An electric field is a vector field that associates to each point in space the Coulomb force experienced by a unit test charge. In the simplest case, the field is considered to be generated solely by a single source point charge.

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|  | Electric field due to stationary point charge is:  Where er is the radial unit vector. |  |