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Perspective

Electric Potentials of Particle Accelerator Involving in Protons and Electrons of Gas Flow

Sasaki Tenzo*

Department of Engineering, Nagaoka University of Technology, Niigata, Japan

DESCRIPTION

The particle accelerator is a device which produces beam of fast-moving, electrically charged atomic or subatomic particles. As the physicists, uses the accelerators in fundamental research base on the structure of nuclei, nature of nuclear forces, and properties of nuclei that are not found in nature, as in trans uranium elements and other unstable elements. It is also used for radio-isotopic production, industrial radiography, radiation therapy, sterilization of biological materials, and at certain form of radio-carbon dating.

It exists in many shapes and sizes, but the smallest accelerators share the common elements with larger devices. First, all accelerators must have a source that generates electrically charged particles electrons in the case of television tube and electrons, protons, and their antiparticles in the case of larger accelerators. All the accelerates should have electric fields to accelerate the particles, and must have magnetic fields to control the paths of the particles. The particles that travel through a good vacuum is, present in a container with a little residual air as possible, as in a television tube. Finally, all the accelerators have detecting, counting, and measuring of a particle which has been accelerated through the vacuum.

In electrons and protons, the particles are commonly used in accelerators, and present in all materials, and the appropriate particles are separated. The electrons are produced in the same way like television picture tube, and the device known as electron "gun." It contains a cathode in a vacuum, which is heated so that electrons may break away from the atoms in the cathode material. The emitted electrons, which are negatively charged, are attracted toward an anode, where they pass through a hole.

The heating of gas flow and particle acceleration within the nozzle are based upon four assumptions:

- The spray particle is spherical with negligible internal temperature gradients.
- The particle specific heat is independent of its temperature and constant.
- The gravitational effect and interaction between particles are ignored.
- The influences of particles on gas flow are neglected.

The main key feature for accelerating the electric field has the simplest example, ie., uniform static field between positive and negative electric potentials (voltages), and the field exists between the terminals of an electric battery. This force accelerates the electron; velocity and its energy will be increasing. The electrons moving towards a positive potential along a wire or in air will collide with atoms and loses the energy, but if the electrons pass through a vacuum, they will accelerate as they move towards the positive potential.

The modeling of particle acceleration and heating flow uses the conventional equations for droplet motion in flows and heat transfer. The main effects are due to the high temperature gradient prevailing in the boundary layer that surrounds the particles, strongly which is varying from plasma properties, non-continuum conditions, thermophoresis, turbulent dispersion, evaporation and possible chemical reactions for the particle surface. The models that are based upon the heat conduction equation are generally one-dimensional which allows the tracking of melting, evaporation and possible re-solidification in a particle. However, the recent works has shown that there is a large difference in velocity between the flow and particles that can induce the convective movements inside the particles.

Both linear and cyclic accelerators are generally accelerate the particles by using alternating electric fields present in the electromagnetic waves, that has typical frequencies from 100 to 3,000 MHz ranging from radio waves to microwaves.

CONCLUSION

The electromagnetic wave is the effect of combination of oscillating electric and magnetic fields vibrating at right angles to each other. The main key for a particle accelerator is to set up

Correspondence to: Sasaki Tenzo, Department of Engineering, Nagaoka University of Technology, Niigata, Japan, Email: sasaki@nag.ac.jp

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the wave, when the particles arrive; the electric field is in the direction to accelerate the particles. This can be done with standing wave and the combination of waves moving in opposite directions is enclosed space, rather like sound waves vibrating in an organ pipe. Alternatively, for very fast-moving electrons that travel very close to the speed of light the traveling wave can be used for acceleration.