

OCR B Physics A Level

6.2.3 - Particle Accelerators

Flashcards

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Explain briefly how an electron accelerator works.



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Electrons are emitted from a heated piece of metal and accelerated over a large potential difference towards a positive plate.



What energy transfer occurs when the electrons are accelerated across a potential difference?



What energy transfer occurs when the electrons are accelerated across a potential difference?

Electrical potential energy is converted into kinetic energy.



Give an equation for the kinetic energy of the accelerated electrons.



Give an equation for the kinetic energy of the accelerated electrons.

$$\frac{1}{2} mv^2 = eV$$



Rearrange the previous equation to produce an expression for the final speed of the electrons.



Rearrange the previous equation to produce an expression for the final speed of the electrons.

$$v = \sqrt{\frac{2eV}{m}}$$



What limits the maximum speed of the particles in a linear particle accelerator?



What limits the maximum speed of the particles in a linear particle accelerator?

The length of the accelerator.



What are cyclotrons?



What are cyclotrons?

Cyclotrons are a form of a circular particle accelerator.



What is the advantage of using circular accelerators?



What is the advantage of using circular accelerators?

They are not limited by length so the particles can reach much higher speeds.

