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# Mass Spectrometer

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## 1 MASS SPECTROMETER

The mass spectrometer is an instrument which can measure the masses and relative concentrations of atoms and molecules. It makes use of the basic magnetic force on a moving charged particle.  $r = (mv/qB) = (mE/qBB)$  The mass spectrometer is an instrument which can measure the masses and relative concentrations of atoms and molecules. It makes use of the basic magnetic force on a moving charged particle.  $r = (mv/qB) = (mE/qBB)$

### 1.1 CIRCULAR PATH FROM MAGNETIC FIELD

If a charge moves into a magnetic field with direction perpendicular to the field, it will follow a circular path. The magnetic force, being perpendicular to the velocity, provides the centripetal force.

### 1.1.1 VELOCITY SELECTOR

A velocity selector is used with mass spectrometers to select only charged particles with a specific velocity for analysis. It makes use of a geometry where opposing electric and magnetic forces match for a specific particle speed. It therefore lets through undeflected only those particles with the selected velocity. A velocity selector is used with mass spectrometers to select only charged particles with a specific velocity for analysis. It makes use of a geometry where opposing electric and magnetic forces match for a specific particle speed. It therefore lets through undeflected only those particles with the selected velocity.

**APPLICATIONS OF MASS SPECTROMETERS** Mass spectrometers are used for the analysis of residual gases in high vacuum systems. A velocity selector is used with mass spectrometers to select only charged particles with a specific velocity for analysis. It makes use of a geometry where opposing electric and magnetic forces match for a specific particle speed. It therefore lets through undeflected only those particles with the selected velocity. A velocity selector is used with mass spectrometers to select only charged particles with a specific velocity for analysis. It makes use of a geometry where opposing electric and magnetic forces match for a specific particle speed. It therefore lets through undeflected only those particles with the selected velocity.

## 2 MAGNETOHYDRODYNAMICS

### 2.1 MAGNETOHYDRODYNAMICS

- A magnetohydrodynamic generator has been described as a magnet on the tail of a jet engine. A super-hot plasma is created, ionizing the atoms of the fuel mixture. The magnetic field deflects positive and negative charges in different directions. Collecting plates for the charges provide a DC voltage.
  - Magnetohydrodynamics as an electricity generation process holds the possibility of very efficient fuel utilization because the extremely high temperatures at which it operates correlate to a high Carnot efficiency. Its practical application has been slow in coming because of a number of problems, including a high rate of damage to the combustion chamber by the high velocity particles.

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### 2.2 SOURCES

1. <http://hyperphysics.phy-astr.gsu.edu/hbase/magnetic/maspec.html>
- 2.

3.