

# RWA

rotating-wave accelerator



The Rotating-wave accelerator is a compact and high-power electron accelerator that allows efficient acceleration of electrons to high velocities.

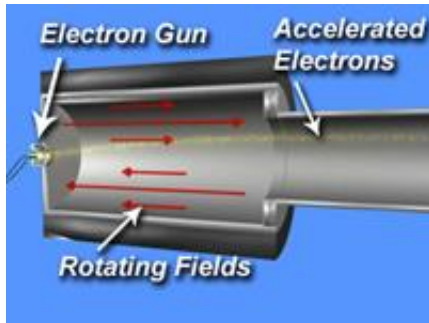
## Overview

The RWA accelerator developed by Acelera uses a single, smooth-wall cylindrical cavity holding a transverse-magnetic field to accelerate electrons to higher energies. The accelerator is designed to operate at UHF or microwave frequencies and uses a set of electromagnets to provide the required magnetic field for efficient acceleration of low energy electron beams.

## Advantages

- The RWA offers twice the efficiency of conventional small accelerators in addition to having a greater degree of simplicity and a more compact design.
- Since the RWA requires half the electrical power to operate, this translates into a 50% savings in electrical power costs.
- The novel RWA mechanism lends itself to high power operation and production of a DC-like accelerated electron beam.

## Features



The fact that the RWA uses only a single cavity (with a length equivalent to several wavelengths) allows the use of high accelerating electric fields without the fear of arcing.

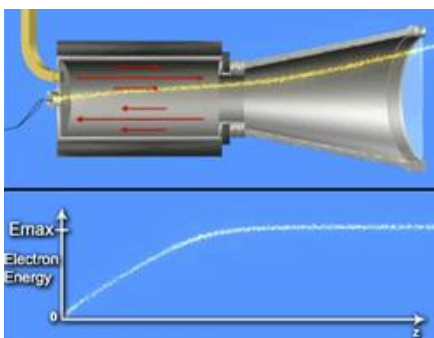
The peculiar accelerating mechanism of the RWA allows for the efficient acceleration of the entire electron beam. That is to say, all the electrons forming the beam are equally accelerated. This results in a dc-like

acceleration of the electron beam.

The RWA design lends itself to very high power operation due to the fact it uses a smooth-wall cylindrical cavity that provides a large wall surface area for suitable dissipation of rf power.

This accelerator has numerous possible applications including food processing, flue gas remediation and wastewater treatment.

## How does the RWA works?



The rotating-wave accelerator is composed of an electron source, a single short cavity and a focusing magnet. When rf power is injected into the cavity a rotating mode is generated inside which presents an axially-oriented rotating electric field. As electrons enter the cavity, due to the magnetic field produced by the magnet, they begin rotating about the device axis.

Under the proper conditions both the rf electric field and the electrons rotate synchronously about the axis at the same rate. It is this synchronous interaction that allows the electrons to be gradually accelerated by the rotating field in a DC-like fashion.