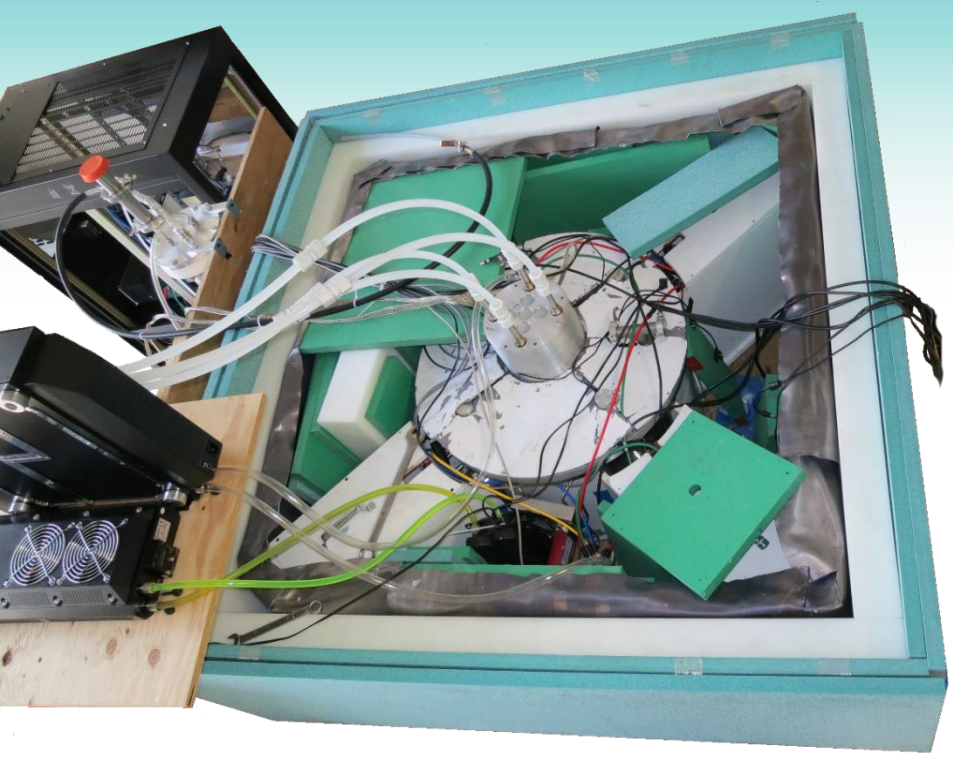
Adelphi Technology Inc.

2003 East Bayshore Road, Redwood City, CA94063 info@adelphitech.com, +1 650-474-2750

DD110MB, Multi Beam Neutron Generator



DD110MB
Multi-beam high thermal flux neutron generator

The DD110MB is the most powerful neutron generator produced by Adelphi Technology and can be used in lieu of a nuclear reactor for some applications such as neutron activation analysis.

Four deuterium ions beams are directed radially inwardly towards titanium targets, which surround a cylinder of high density polyethylene (HDPE). The deuterium ions fuse (via the D-D reaction) on the titanium targets producing 2.45 MeV neutrons which are then moderated to thermal energies by the HDPE.

Neutron output:

- 2×10^{10} Fast neutrons/s
- 5×10^{7} Thermal neutrons/s/cm^2

Nuclear reactors and accelerators can produce higher fluxes of thermal neutrons, but they are large and expensive and have considerable safety considerations that must be addressed in their operation. These issues limit the use of these sources to a few government and regional sponsored facilities. The DD110MB from Adelphi Technology is small enough to be suitable for a larger community of scientists, engineers and businesses in modest-sized laboratories and universities.

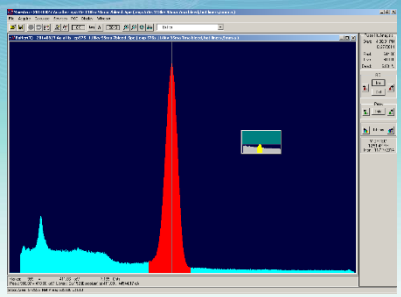
The DD110MB operates with four ion beams from microwave-driven electron cyclotron resonance (ECR) plasma sources. Both pulsed and continuous operation is available.

The DD110MB can produce a thermal (< 0.5 eV) neutron flux of 5 x 10^7 neutrons/cm^2/sec.

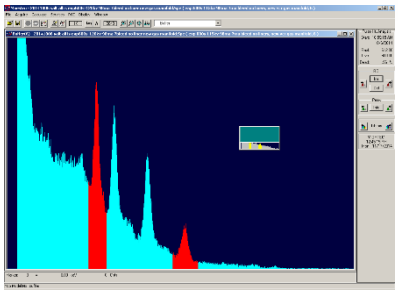
Camera view of the four deuterium ion beams operating in the above system

DD110MB, high thermal flux neutron generator

The DD110MB is an ideal neutron generator for neutron activation analysis. Since the generators are easily serviceable, they offer a long life-time neutron generator for laboratories and commercial systems requiring continuous operation. The DD110MB uses safe deuterium gas and is not sealed, having a turbo pumped vacuum system. Since no radioactive tritium is employed in this neutron generator, it can be easily serviced, and components such as the target and plasma aperture, can be periodically replaced to provide essentially an unlimited lifetime. A forced-air chiller cools the titanium targets that are being bombarded by 12 kW of deuterium ions. The generator head can be enclosed in optional radiation shielding (partially shown in the photographs). The radiation shielding can be adequate for film-badged radiation workers at 30 cm (< 5 mR) from the generator head. An optional pneumatic-operated "rabbit" system can quickly send samples to locations outside the generator head where they can be analyzed for their characteristic gamma emission. This minimizes the time between irradiation and measurement, permitting instrumental neutron activation analysis (INAA) to be performed for materials that have a short half-life.



Delayed γ-ray measurements of a sample of gold (Au)



Delayed γ-ray measurements of a sample of salt (NaCl)

Adelphi Technology Inc.

2003 East Bayshore Road
Redwood City
CA94063

+1 650-474-2750
info@adelphitech.com