



DD108 and DD109 series Neutron Generators

The most popular family of Adelphi products are the D-D (deuterium-deuterium) neutron generators. The energy of the free neutron from this reaction is 2.45 MeV, which is easily moderated to thermal energies to support many experiments in materials science. Also, this energy is easier to shield, allowing more possible installation sites.

The “open vacuum” D-D systems allow disassembly for maintenance or re-configuration without being returned to the Adelphi factory. In most systems, a turbo pump is in constant operation and a small bottle of deuterium gas feeds the plasma source. The key components of a D-D generator can be replaced when they wear out, which is much preferred to exchanging the whole accelerator head. Moreover, the constantly replenished ion source does not suffer from the same limited lifetime as sealed generators, which produce only a fixed number of neutrons and then must be discarded. An Adelphi D-D generator has an almost unlimited tube lifetime.

Product	Output
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DD108	1×10^8 neutrons/s
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DD109.1	1×10^9 neutrons/s
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DD109.3	3×10^9 neutrons/s
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DD109.4	4×10^9 neutrons/s
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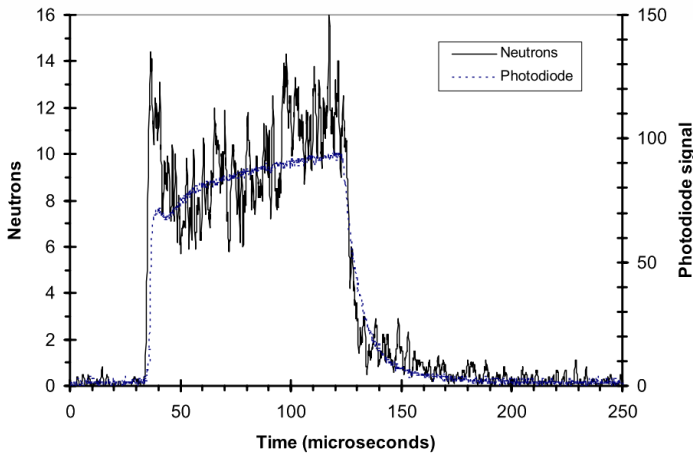


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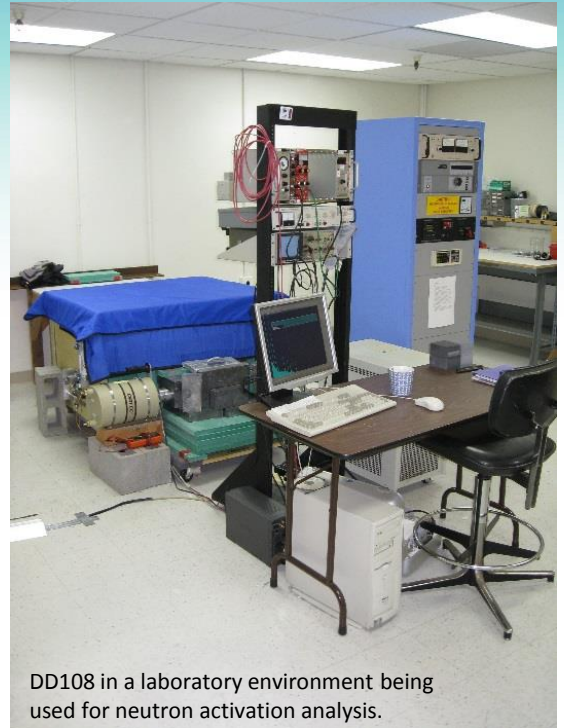
The full neutron generator system consists of three main parts: the accelerator head, a cooling unit, and a power rack. The power rack consists of a microwave power supply, a high voltage power supply running at approximately 120 kV (maximum), and vacuum and gas controlling gauges and interface controls. The entire system is controlled by a computer using serial-over-ethernet to communicate to all the subsystems of the generator. The computer display includes message logging to alert the user of the condition of the generator. Displayed indicators show interlock status of all critical functions of the generator.

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There are two methods for pulsing Adelphi generators, available as options on most systems. Pulsing the power to the ion source allows repetition rates of up to 10 kHz. This mode uses a TTL command pulse from the operator's equipment. For pulse shapes requiring fast pulse falloff, the acceleration voltage can also be pulsed.



Pulsed operation of the ion source



DD108 in a laboratory environment being used for neutron activation analysis.



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