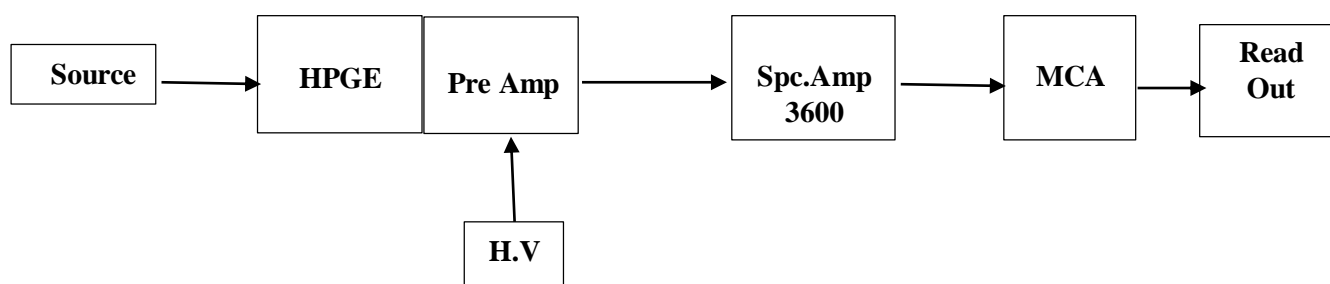


HPGE Proportional Detector Spectroscopy System

Required Equipment

- HPGE proportional detector
- Preamplifier
- Liquid nitrogen tank (Dewar)
- Bin power supply model 8000 and 8010
- Model 3600 spectroscopy amplifier
- Multichannel analyzer (MCA) model 4110
- High voltage power supply
- Nitrogen injections
- DAS spectrography software
- BNC and SHV cables

This set is described in the following figure.



All products are provided by Iman Gostar Raman Kish Company, except detector and liquid nitrogen tank (Dewar).

Instruments used in this set

1. HPGE Detector

The high pure germanium detector is the best detector for gamma ray emission spectroscopy. Using this detector, we can obtain highly accurate spectra of energy from various samples.

2. Liquid Nitrogen Tank (Dewar)

The high pure germanium detector should be used at liquid nitrogen temperature. So, it is used with this detector.

3. BIN Power Supply Model 8000

The 8000 power supply is a 19 inch rack with a power supply of 160 watts, and all of its connectors have the standard voltage of a NIM bin.

Specifications

- Input: 220 or 115 Vac,
- Output impedance: $< 0.3 \Omega$ at any frequency up to 100 KHZ for the dc output
- Temperature coefficient: $< 0.02\% / ^\circ C$, 0 to $60^\circ C$
- Output ripple: $< 3 \text{ mV}$
- Voltage adjustment: $\pm 2\%$ minimum range

4. Spectroscopy Amplifier Model 3600

The 3600 spectroscopy amplifier used in nuclear spectroscopy amplifies and shapes the signals coming from the preamplifier.

Specifications

- Input: accepts positive or negative pulses from an associated preamplifier.
- Input impedance: $\approx 1 \text{ kilohm}$.
- Connector: BNC
- Output: Semi-Gaussian shaped pulses, unipolar and bipolar
- Output: $\pm 5 \text{ mV}$
- Output impedance: $\approx 93 \text{ ohms}$
- Gain factor: 0.3 -3000

5. Multichannel Analyzer (MCA) Model 4110

The IAP model 4110 MCA is a high resolution Wilkinson type multichannel analyzer. The 4110 is a single NIM mode that is specifically designed for use in nuclear and x-ray spectroscopy and connects via a USB port to PC. Also, MCA is fully supported by DAS software.

Specifications

- Accepts Signal: positive or bipolar pulses (positive portion leading).
- Input range: 25 mV to 10 V.
- Input impedance: 1000Ω .
- Rise time: 100 ns to 100 μs .
- Fall Time: 200 ns to 100 μs .
- Width: 0.5 μs minimum.
- Input couple: DC – coupled.
- Connector: front panel BNC.

6. 8100 High Voltage Power Supply

The 8100 high voltage power supply is used for biasing various detectors.

Specifications

- Output polarity: positive or negative
- Output voltage: 0 to 5 KV
- Output current: 0- 10 mA
- Output ripple: < 10 Mv
- Regulation: < 0.0025%
- Power: 220 Vac

7. DAS Spectrography Software

DAS spectrography software is used to connected to different hardwares. Using this software can extract all the required information and spectral analyzes from the nuclear spectra.

8. Connectors

- SHV and BNC