B8R07784 Spark Discharge Apparatus NFU 709

Purpose

The Spark Discharge Apparatus is an extremely visual and audible demonstration of the ionization of air caused by Alpha particles. As the Alpha source is moved along the brass mesh Alpha particles ionize the air, causing a conductive path to form from the mesh to the conductor below, causing a shower of bright sparks and a crackling sound. Moving the source along the track clearly demonstrates that the sparks follow the source.

The sparks occur between the metal gauze (which is earthed) and a fine wire connected to the high voltage output of the EHT power supply.

Specification

Maximum input voltage	5kV
Mesh aperture	73 x 13mm
Internal capacitor	6.8 nF

Safety

Warning! Use only a current limited 5kV power supply

- **Switch off the power supply before making any connections**
- **Ensure the connections are made with the correct polarity. This will ensure that the mesh is grounded and remove any risk of electric shock**
- **Use shrouded, touch proof leads**
- **Do not touch the leads when the power supply is switched on**

The high voltages produced by the EHT power supply are capable of giving shocks to careless users, but the maximum current is limited to 2mA, as recommended by both CLEAPSS and SSERC it is also in full compliance with BSEN 61010. It would be sensible for teachers and students with pacemakers or cochlear implants to take extra care, or avoid using the unit.

Required Equipment

5kV dc current limited power supply	(G85495)
Shrouded 4mm leads	(B8R05927 and B8R05926)
Sealed source of americium-241, 5 µC	(B8A49591)
Source handling tool	(B8A49608)

Using the Spark Discharge Apparatus

- Make sure that the EHT power supply is switched OFF
- Connect the positive output to the red terminal on the Spark Discharge Apparatus (for best results use the 2mA output terminal)
- Connect the negative terminal to the black terminal on the Spark Discharge Apparatus
- Connect a lead from the negative output to the green earth terminal (if available)
- Switch on the EHT power supply and slowly increase the voltage until arcing begins and then reduce the voltage slightly until only occasional sparks are seen. Do not set the voltage so high that a continuous arc occurs as this could damage the apparatus
- Using the source handling tool, hold the source over the metal gauze and a bright shower of sparks should be seen and heard. Note the random timing of the sparks
- Move the source along the gauze. The sparks will follow the position of the source
- Move the source further away from the source and estimate the maximum distance before the sparks stop. Try carefully adding a piece of paper over the gauze and see what affect it has on the number of sparks generated.
- Alpha is the most ionizing form of radiation. Try the experiment again with a Beta or Gamma source (probably better to try this before demonstrating this, as many Beta and Gamma sources emit increasing amounts of Alpha particles as they get older)

Periodic testing

If you find that you start to get sparking at lower voltages over time, check that case is clean and that debris has not fallen through the mesh, reducing the gap between the mesh and the wire. Check that the mesh is straight and equidistant from the wire. If the mesh has been pushed down, unscrew the box lid and remove the two 4mm terminals to gain access to the mesh to straighten it.

Disposal of Waste Electrical and Electronic Equipment (WEEE)

Do not dispose of this product with household waste

- For the proper treatment, recovery and recycling please take this product to an appropriate collection point.
- If you are unsure where this is, contact your Local Authority
- By disposing of this product correctly you will be providing positive help to the environment.

Warranty, repairs and spare parts

The Spark Discharge Apparatus is guaranteed for a period of one year from the date of delivery to the customer. This warranty does not apply to defects resulting from the action of a user such as misuse, improper wiring, any operations outside of its specification, improper maintenance or repair, or unauthorized modification.

Our liability is limited to repair or replacement of the product. Any failure during the warranty period should be referred to Customer Services or techsupport@unilab.co.uk

Instructions for authorized service technicians

Please refer to the detailed service procedures, safe servicing and continued safety – contact techsupport@unilab.co.uk for advice.

Please refer to product specific risks that may affect service personnel, the protective measures and verification of the safe state after repair.

Supplier details

Philip Harris Education, 2 Gregory Street, Hyde, Cheshire, SK14 4RH

Orders and Information:
Tel: 0845 120 4521
Fax: 0800 138 8881

Repairs:
Tel: 0845 120 3211

Technical Support:
E-mail: techsupport@unilab.co.uk
www.Unilab.co.uk