

## **Safe Operating Procedure for use of $^{241}\text{Am}$ sealed source in NPL 162**

Matt Kallander, revised 8/2/2021

Sealed  $^{241}\text{Am}$  radioactive sources will be installed in the KATRIN detector test system in NPL 162. The source will be mounted on a rotating rod inside the vacuum system and irradiate the detector from different angles.

### **PPE Requirements:**

- Wear gloves when handling the source and do not touch the metallic surface.
- Minimize exposure (minimize time, maximize distance) when handling and installing the source.
- Wash hands after handling the source.

### **Source Use Procedure:**

- Only handle the source if you have completed the sealed source radiation safety training.
- Perform a reference background measurement before the source is installed:
  - o Survey the cryostat and work surface with a Geiger counter.
  - o Use the installed KATRIN detector wafer to get an energy spectrum without any source installed.  $^{241}\text{Am}$  alphas and gamma peaks would be identifiable in the spectrum if material is present in the cryostat.
  - o Need a result consistent with background before proceeding.
- Install the source on the rotating mount in the cryostat to use.
  - o The detector is mounted to the lid and can be changed without moving the source.
  - o The source and mount are not accessible once the cryostat is sealed. Data is only taken with cryostat sealed.
  - o The source angle is adjusted externally; there is no need to touch the source other than to deploy or remove it.
- After the source is removed, perform a background measurement.
  - o Take another energy spectrum with the same KATRIN detector, with the source removed. If there is no leak, results will still be consistent with background.
  - o If any alpha activity is detected, it indicates a radioactive leak. Inform Eric Smith, Gary Holman, or Alejandro Garcia.
- When not in use, store the source in the radioactive materials fume hood (Hood #2). Lock the hood while storing the source there.