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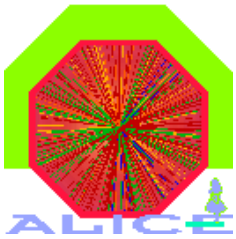

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Procedure to insert and remove two alpha sources (RP4183 / RP4184) into the ALICE TPC gas quality monitor

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1. Description of the device and location of the sources

The TPC gas quality monitor (Goofie) is located in the ALICE gas building SG2 (2270), in the so-called analysis rack, and will be permanently flushed with the TPC gas (Ne-CO_2-N_2 [90-10-5]) at a flow of about 10 l/h. The gas is subsequently exhausted to the building's exhaust line, and vented to atmosphere.

The detector is housed in a stainless steel cylinder with 1 mm wall thickness (see Fig. 1). Each source package is inserted inside a slit holder between two circular plates, facing a small detector in front. These locations are clearly visible in the structure. The isotopes used are ^{241}Am each with an activity of 90 kBq at the time of production in 2001. The final configuration of the sources is depicted in Fig. 2. The device is brought to the Radioactive-Sources Service (RP) for insertion and removal of the sources.

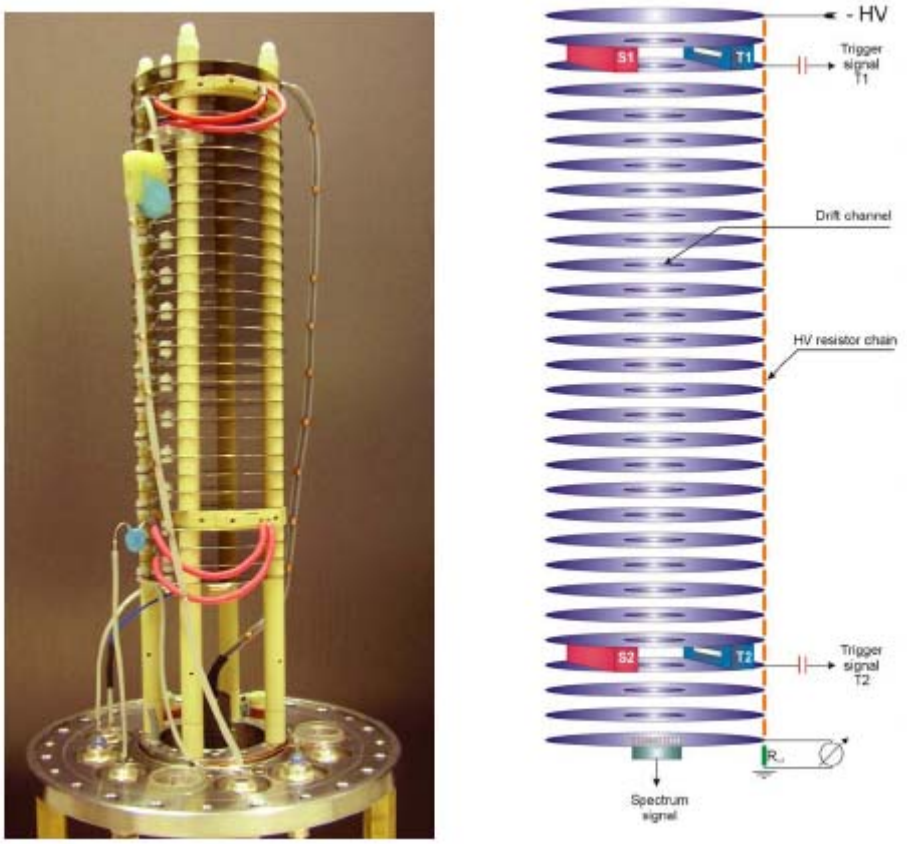

Fig. 1. Left: photograph of the device. The positions of the two detectors facing the sources are visible (red cables going to them). Right: Schematic view of the device, showing the location of the sources (red boxes, S1 and S2).

2. Insertion procedure (to be done under RP supervision in an appropriate laboratory)

- Sources must have been checked for contamination beforehand by RP (and exempt of contamination, according to RP regulations in effect)
- Laboratory blouse & gloves should be used by people manipulating sources & Goofie. Adequate workplace to perform the insertion should be provided; it must be equipped with blotting paper to avoid spreading contamination in case of problem.
- Open the Goofie (ALICE team).
- Take one source at a time.
- Take one M3 metal screw (provided by the ALICE team) and insert it partially in one of the two threaded holes on the back side of the source package. This provides a 'handle' to push in or pull out the source from its slit (RP).
- Remove the front grey cover by unscrewing the two nylon screws that hold the cover to the source package. This action leaves the source exposed. (RP)
- Make sure the two head-less nylon screws in the source holder are loose enough so that they are not in the way. (ALICE)
- Identify a mark inside the holder which determines how deep the source package must go into the slit. (ALICE team)
- Insert the source package into the slit. Push it in gently, if needed using a screwdriver or pliers, until the outer edge reaches the mark. (ALICE team)
- Pull back from the metal M3 screw if needed to position the source relative to the mark. (ALICE team)
- Screw in the two head-less nylon screws to hold the source package in place. (ALICE team)
- Repeat the operation with the second source.
- Close the Goofie (ALICE team).
- Seal the device with a wire (RP).
- Radiological control of the blotting paper and tools used during the manipulation.

3. Removal procedure for annual inspection

- The ALICE team brings the device to the RP headquarters.
- Radiological control of the external side of the device, smear tests at the joints (RP).
- Laboratory blouse & gloves should be used by people manipulating sources & Goofie. Adequate workplace to perform the removal should be provided (insertion); it must be equipped with blotting paper to avoid spreading contamination in case of problem.
- Remove the wire sealing (RP) and open the Goofie (ALICE team), with an air monitoring device switched on. (RP)
- Release the two head-less nylon screws at the holder of one of the packages. (ALICE team)
- Insert partially the M3 metal screw into one of the holes at the back of the source package. (ALICE team)
- Pull from this metal screw until the source package comes out. (ALICE team)

- Contamination check of the slit (to ensure that no contamination remains inside the Goofie). Wipe test with a swab moistened with ethanol (RP).
- Smear test directly on the source itself (swab moistened with ethanol) and direct measurement with adequate handheld instrument. A second measurement is performed with an adequate counter to lower detection limit.
- Put the protection grey cover at the front of the source package. (RP)
- Repeat the operation with the other source.
- Radiological control of the blotting paper and tools used during the manipulation.

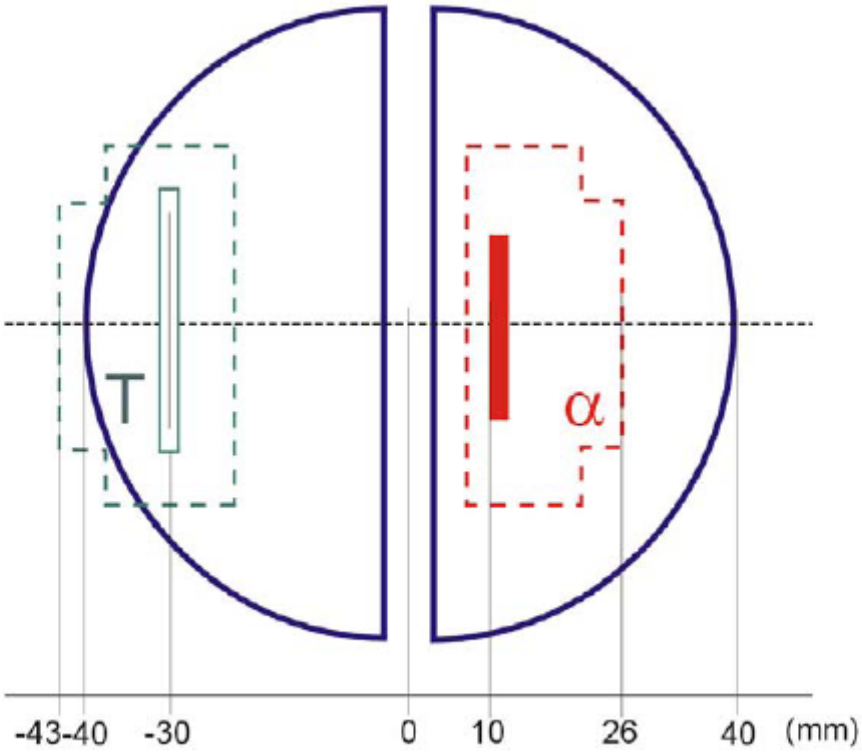

Fig. 2. Top view of the source package (a) facing the corresponding detector. The distance between source and sense element is optimized for the Bragg peak.

4. Control of the filter(s)

- Every six months for the first year of run.
- Every year after that.
- The exchange of the filter will be done under RP supervision.
- It is ALICE team responsibility to organize a meeting to exchange the filters.
- Filters will be collected by the RP team to perform gamma spectrometry analysis, in order to estimate the potential degradation of the sources (contamination of the gas). In case of contamination of the filter by Am-241, the sources will be exchanged immediately.