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TARGETS DEVELOPMENT AT CERN: MEDICIS LARGE CONTAINER

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CERN-MEDICIS is a CERN facility dedicated to the production of isotopes for medical research in a very pure form. Such radioisotopes are produced in ISOLDE target production area by taking advantage of the 1.4Gev proton beam with low energy degradation which is still available after ISOLDE target interaction before reaching the dump. MEDICIS targets are designed to be larger than ISOLDE standard targets in order to be able to account for proton beam scattering after the ISOLDE target. After the irradiation step, the target units are moved to the MEDICIS front-end, where they are heated to temperatures higher than 2000℃. One of the main goals of the target development is to have a temperature homogeneity in all over the surface of the container and ion source and transfer line, avoiding the cold spots where the isotopes can condense and are thus lost during the extraction process.
For the ISOLDE targets, to achieve that, a special thermal insulation is proposed to be placed around the container, transfer line and ion source. To this moment, in ISOLDE targets (small container), thermal screens from Ta, W and Mo are used as a thermal insulation. This solution has proved to be unstable at high temperatures as the efficiency decreases during the heating cycles. In order to improve the thermal insulation of the targets, new industrial alternatives (rigid/flexible carbon foam or ZrO2 advanced ceramic insulation etc.) are studied and aimed to give a more stable-efficient result over time.
The MEDICIS target 673M (large Ta container with rigid carbon foam as thermal insulation and with Ta-rolls & graphite spacers inside the container) has been designed, built and tested online (target up to 1000 A and ion source up to 270 A) giving us useful results for the future research and development of the targets.

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Primary author: Mr SAMOTHRAKIS, Vasileios (Ministere des affaires etrangeres et europeennes (FR))

Co-authors: STORA, Thierry (CERN); MARZARI, Stefano (CERN); RAMOS, Joao Pedro (KU Leuven (BE)); ROTHE, Sebastian (CERN)

Presenter: Mr SAMOTHRAKIS, Vasileios (Ministere des affaires etrangeres et europeennes (FR))

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