

## The most modern mechanical technologies and cutting edge radio-analytical techniques merged for extremely low background achievement

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The sensitivity of the experiments, searching for rare and low energy processes which could explain the most fascinating open questions of the modern physic, is limited by the radioactive background of the whole experimental apparatus. Radiometric and non-radiometric cutting edge analytical techniques have already been widely applied for the screening of the materials available on the market. Likely the new frontier of low background experiments requires new materials development, suitably studied, in order to match the thermal, mechanical and radio-purity performances needed in this field of physic.

The recent and rapid diffusion of 3D printing technologies allows producing plastic and metal parts characterized by complex geometry and reduced weight in comparison to the same structural parts obtained by traditional machining. In this project 3D printing, supported by high sensitivity analytical techniques such as ICPMS, ULL-GRS and NAA, will help the achievement of very low background conditions. The monitoring of the purity of the material during the production starting by the metal or polymer to the finished object will be discussed.

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