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Thermal mechanical simulations of a new germanium detector developed in the European project LEAPS-INNOV for X-ray spectroscopy applications at synchrotron facilities

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For X-ray spectroscopy applications it has been verified that Germanium detectors are enable to detect efficiently photons of considerable higher energy with respect to Silicon detectors. On the other hand, another advantage for cases like fluorescence detectors for absorption spectroscopy (XAFS), Germanium detectors do not show artifacts due to features like the escape peak interfering with interesting peaks being measured. In this context, the European project LEAPS-INNOV has launched a Research and Development program dedicated to creation of a new generation of Germanium detectors for X-ray detection.
From the thermal mechanical point of view, in order to optimize the efficiency of the new Germanium detector, finite element analysis (FEA) studies have been carried out on different geometrical models. In this paper, the thermal mechanical calculations of the current prototype are presented, as well as the details of the modifications implemented since the beginning of the project, with the main objective of optimizing the operating conditions of the Germanium sensor and its associated components. For the numerical simulations, ANSYS WORKBENCH software has been used.

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Footnotes

On behalf of the LEAPS-INNOV XAFS-DET consortium

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