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Monte Carlo simulation of the 60Co Calliope irradiation facility with FLUKA

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The Calliope irradiation facility, located in the ENEA Casaccia research center, is a large pool-type irradiation plant capable of processing different kind of samples, even biased electronics and detectors. The activity of the facility is focused on the radiation hardness measurement of materials and components for space and high-energy physics applications. The irradiation hall is 6x7 m2 wide and is 2 m high, the radioactive source is composed by several cylindrical 60Co bars arranged in a circular rack located at the center of the hall. The peculiar structure of this facility allows to use a variety of dose rates for the irradiation, starting from few kGy/h and down to few Gy/h. The complex structure of the irradiation hall, with support structures and lead shieldings, and the free-positioning of the samples, calls for a detailed simulation of the radiation field in order to build a dose rate map of the entire plant. Fluka can be used to simulate the entire f!
acility, including in the geometry the fixed and movable elements of the plant and the extended 60Co sources. A grid of dose rate values will be evaluated to build a map of the irradiation hall. This map will be validated with dosimetric measurements inside the hall, continuously updated to follow the source decay, and then will be used to locate the irradiation position with the desired dose rate.

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