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The upgraded low-background germanium counting facility Gator for high-sensitivity γ-ray spectrometry

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The Astroparticle Physics Group at the University of Zurich operates the high-purity germanium (HPGe) γ-ray spectrometer Gator in a low-background environment at the Gran Sasso Underground Laboratory in Italy. It is used to screen and select materials for rare-event search experiments such as XENON, DARWIN, GERDA and LEGEND. The 2.2 kg HPGe crystal is surrounded by a passive shield made of layers of copper, lead and polyethylene, and the sample cavity is purged with gaseous nitrogen for environmental radon suppression. After upgrades of the shield enclosure, the background rate is (82.0 ± 0.7) events/(day kg) in the energy region 100 - 2700 keV. We describe the general facility, the recent upgrades and their impact on the background level. We also demonstrate its sensitivity by presenting the results for several material samples.

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