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Background mitigation techniques with the NEWS-G dark matter detector

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NEWS-G (New Experiments With Spheres-Gas) is a project searching for sub-GeV dark matter with a Spherical Proportional Counter (SPC) filled with low-Z gases (H, He, Ne). A 140cm-diameter sphere has been commissioned at the Laboratoire Souterrain de Modane (France) and is now installed at SNOLAB (Canada). Presented here are the techniques used to reduce the backgrounds, external but more importantly internal. In particular, care has been taken to assay the purity of the sphere material and achieve a clean internal surface. As the gas purity is an important factor in the signal quality, an oxygen filter and a new zeolite-based Radon trap are being used. The goal is to reach a world-leading sensitivity for sub-GeV dark matter search.

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