LOW ENERGY NEUTRON BACKGROUND IN DEEP UNDERGROUND LABORATORIES

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The natural neutron background influences the maximum achievable sensitivity in most deep underground nuclear, astroparticle and double-beta decay physics experiments. Reliable neutron flux numbers are an important ingredient in the design of the shielding of new large-scale experiments as well as in the analysis of experimental data.

Using a portable setup of ^{3}He counters and polyethylene moderators we measured the thermal and epithermal neutron flux at the Kimballton Underground Research Facility, the Soudan Underground Laboratory, on the 4100 ft and the 4850 ft levels of the Sanford Underground Research Facility, at the Waste Isolation Pilot Plant and at the Gran Sasso National Laboratory. Absolute neutron fluxes at these laboratories are presented and the consequences for future underground measurements of neutron producing reactions for nuclear astrophysics are discussed.