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Monte Carlo background simulation in a boron loaded scintillator for the OLVE-HERO detector

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A project of the OLVE-HERO space detector for measurement of the cosmic rays in the range 1012–1016 eV is proposed. It will include a large ionization-neutron 3D calorimeter with a high granularity and geometric factor of ~16 m2 sr. The main OLVE-HERO detector is expected to be an image calorimeter with boron loaded plastic scintillator and a tungsten absorber. Such a calorimeter can measure an additional neutron signal that should improve the detector energy resolution and also the rejection power between electromagnetic and nuclear components of cosmic rays. The Monte-Carlo results of a simplified version of the detector from cosmic protons flux are presented. The purpose of this work is to study the background level that occurs during the formation of evaporation neutrons in the detector, their slowing down to thermal energies, followed by capture by B-10 nuclei and the production of α-particles with an energy of ~2 MeV.

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