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Data driven background estimation in Baksan Underground Scintillation Telescope

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The main reaction used to detect Core-collapse Supernova neutrinos in physical experiments is the inverse beta decay reaction. Positrons produced in the reaction pass through a scintillator only a few centimeters thick. For the Baksan Underground Scintillation Telescope (BUST) detector, which has a modular structure, the inverse beta decay reaction appears as a single trigger of an individual counter. The problem of detecting the reaction from neutrinos in the counter is due to a large background of single events with different natures. The main sources of background single events include: - single muons penetrating through the detector's shielding; - high-energy neutrons producing unstable isotopes in the detector's scintillator; - neutrons participating in elastic collisions with target protons; - unstable isotopes created in cascades through the inelastic interaction of muons with the detector's materials; - local radioactivity; - random counter triggers. This work discusses the methodologies for evaluating each of the background components currently used in processing the experimental data of the BUST detector.

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