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Determination of Yield Functions of Neutron Counters at the South Pole from Monte-Carlo Simulation

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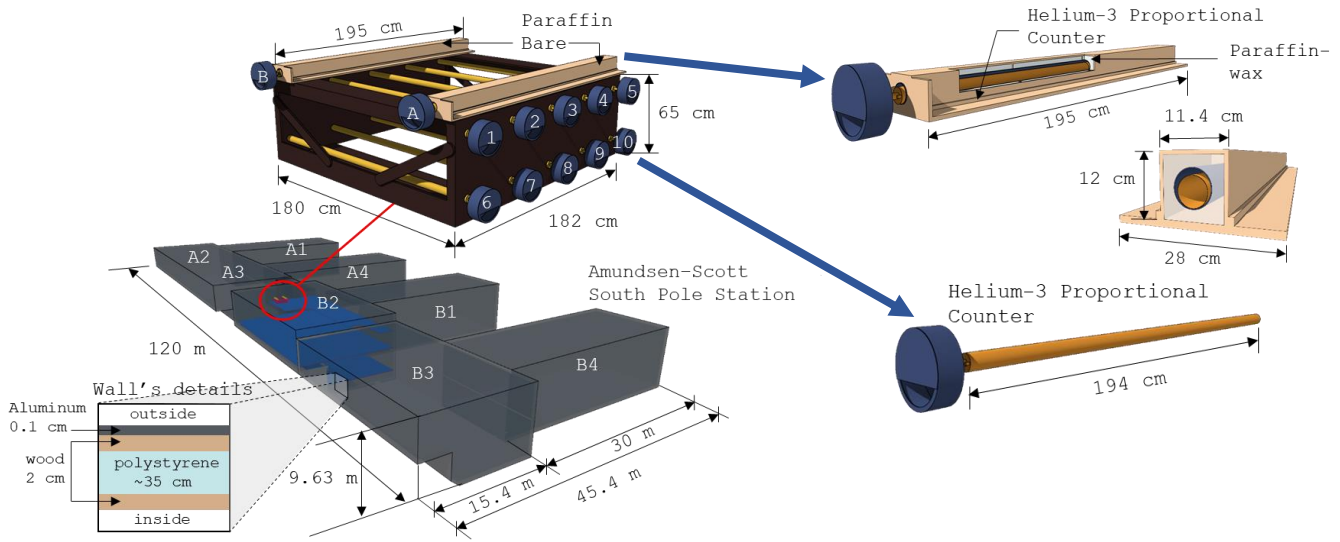
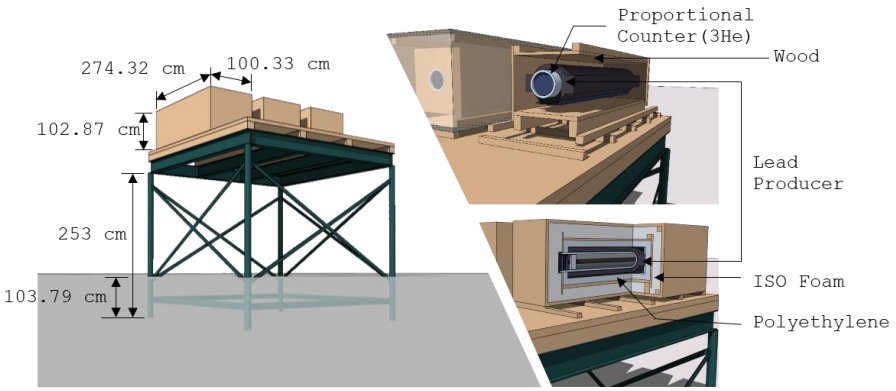


(a) Bare neutron detector



(b) Neutron monitor

Figure 1: (a) Bare neutron detector array at South Pole. (b) Three single NM64s placed in the same row (3NM64) at the South Pole located outside the station. The renderings are created by Flair 3.1, which is an advanced user–friendly interface for FLUKA 4-1.1

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Results

1. The Response Function of Bare

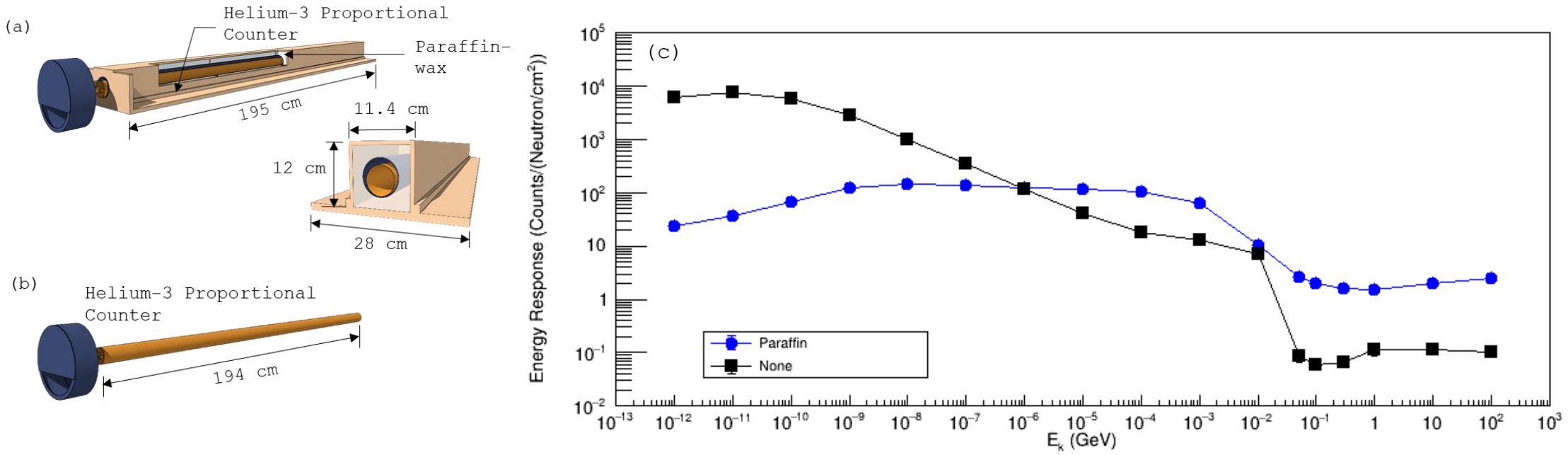

Figure 2: (a) Rendering of an end view and cutaway oblique view of Paraffin-moderated bare detector, and (b) that of the side view of None moderated bare neutron detector Their energy responses of paraffin bare compare with none bare. The deadtime 20 μs has been applied in the analysis.

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Results

2. Comparison of Bare Designs

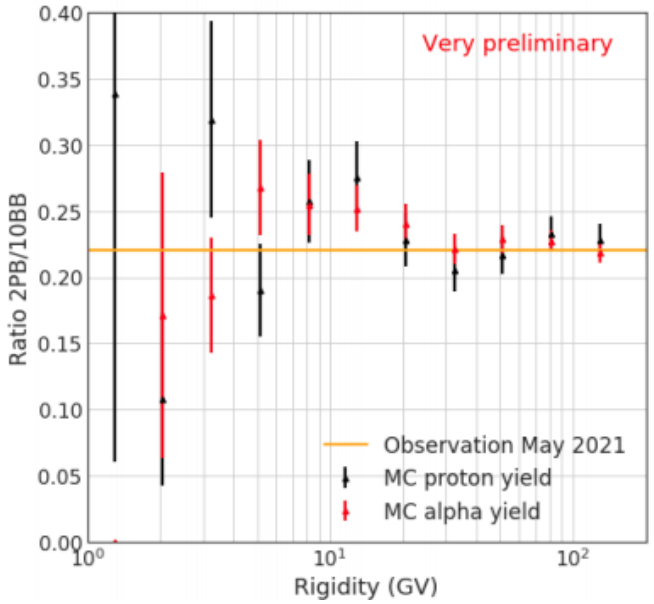

Figure 3: The ratio of the observed count rates at the South Pole for the two types of configuration (orange line) and the ratios of the simulated yield functions (red and black markers).

3. Yield Functions Comparison with Previous Results

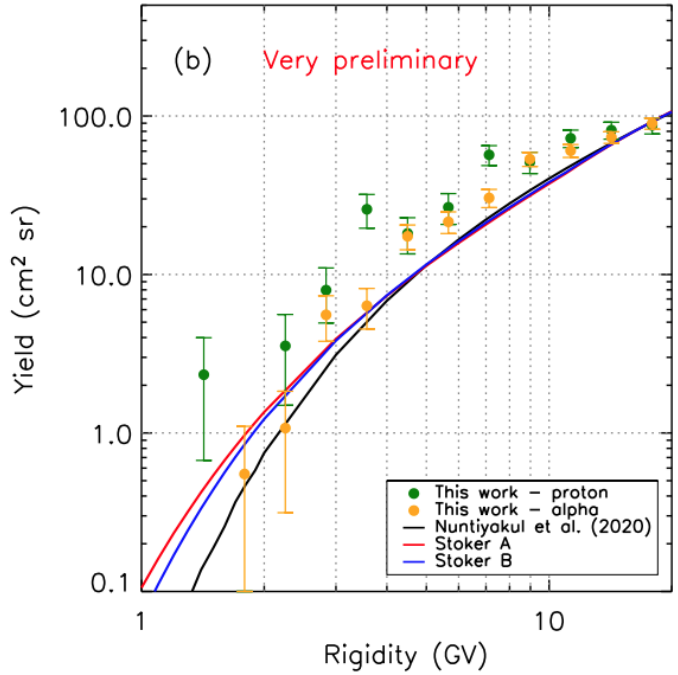

Figure 4: Yield functions of the two Paraffin bares from simulation work (this work) compared to the determination of previous work.