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Analysis of Alpha and Lithium-7 Particle Energy Deposition in BNCT using Geant4 Simulation

This study investigates the microdosimetry of Boron Neutron Capture Therapy (BNCT) using high-fidelity Monte Carlo simulations to quantify the energy deposition distributions from alpha and lithium-7 particles in cellular structures.

We employ Geant4 to model various physics lists and water representations, aiming to optimize the accuracy of BNCT simulations. Dosimetry and microdosimetry studies using these Monte Carlo techniques examined the behavior of the produced alpha and lithium-7 particles and their energy deposition in different cellular compartments. Our findings contribute to the understanding of BNCT's effects at the cellular level, which is crucial for advancing treatment planning and minimizing side effects.

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