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MonteCarlo benchmarking: validation and progress

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Calculational tools for radiation shielding at accelerators are faced with new challenges from the present and next generations of particle accelerators. All the details of particle production and transport play a role when dealing with huge power facilities, therapeutic ion beams, radioactive beams, and so on. Besides the traditional calculations required for shielding, activation predictions have become an increasingly critical component.

Comparison and benchmarking with experimental data is obviously mandatory in order to build up confidence in the computing tools, and to assess their reliability and limitations. Thin target particle production data are often the best tools for understanding the predictive power of individual interaction models and improving their performances.

Complex benchmarks (eg thick target data, deep penetration etc) are invaluable in assessing the overall performances of calculational tools when all ingredients are put at work together.

A review of the validation procedures of Monte Carlo tools will be presented with practical and real life examples. The interconnections among benchmarks, model development and impact on shielding calculations will be highlighted.

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