



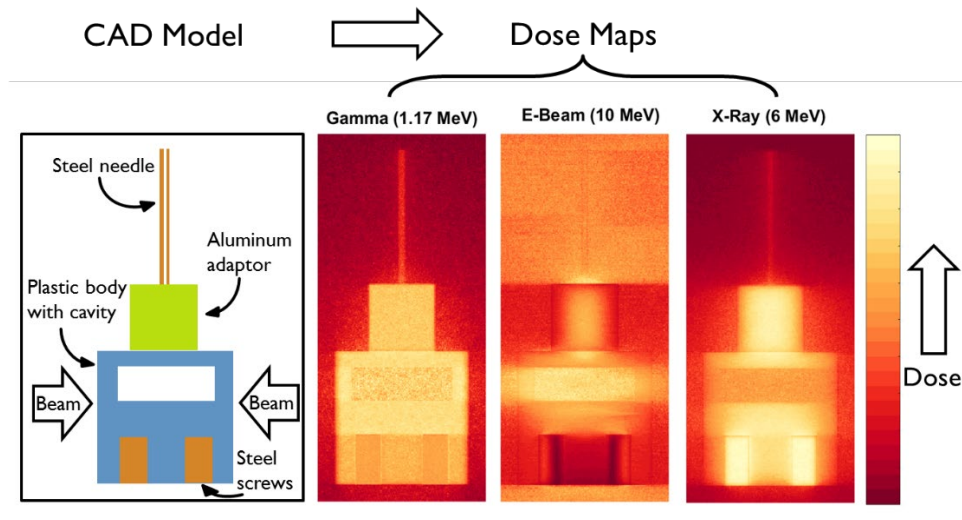
Monte-Carlo Simulation of Radiation Sterilization: Selection and Optimization of the Right Source

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When using radiation sterilization, medical device and pharmaceutical companies are faced with the choice of gamma, electron-beam, or x-ray sources. But which one to choose? While it may be tempting to go with the familiar option, each of these techniques has its own benefits that might make it the ideal choice for a particular product. With a new simulation approach, we can guide companies toward the most efficient, cost-effective, and reliable sterilization method for their product.

Solution

One way to compare gamma, electron-beam, and x-ray sterilization would be to experimentally measure the dose received by a final product design when exposed to each source. However, this is an expensive endeavor which provides limited information about the dose efficiency. Instead, powerful computer simulations can be used to study the equivalency of the different radiation sources.



Physics simulations offer the ability to directly compare gamma, electron-beam, and x-ray sources. The figure above, which shows the simulated dose map received by a sample medical device phantom under multiple sterilization methods. Such information allows the device manufacturer to make an informed decision about their sterilization options, including early in the design cycle, and also enables optimization of sterilization orientation and throughput.

How do we do it?

Dose Insight has developed a powerful software tool capable of realistic simulations of radiation sterilization. The physics in the simulations is powered by the Geant4 toolbox; developed at CERN, Geant4 is the most sophisticated and accurate physics library in existence. Our tool can simulate the full three-dimensional dose distribution received by any product from gamma, electron-beam, or x-ray sources

For more information visit us at www.doseinsight.com or email us (info@doseinsight.com)