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## The combination of HotSpot code and MATLAB to simulate radiological dispersions and evaluate solutions to protect the population

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We are surrounded by emergencies; the past and new threats push researchers to find innovative solutions to increase the safety of the population and the security of the environment. In this paper, the authors will use the HotSpot - Health Physics Codes for the PC to simulate two different scenarios (and several case studies related). The first scenario is constituted by simulations of accidental dispersions of radiological substances in atmospheres (Cs-137, I-131, Co-60, and Sr-90), and the second scenario is constituted by simulations of different fallout due to an Improvised Nuclear Device (IND). The two worst-case scenarios will be used to furnish the boundary conditions to simulate a shielding apparatus (like a bunker) to protect the population; the MATLAB code will be used by the authors to implement this second part of the research. The paper aims to demonstrate that combining open codes, like HotSpot and MATLAB, can be a low-cost solution to support the experts in the prediction and prevention phases of a radiological event.

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