From Nuclear Blasts to Cosmic Bombardment

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Abstract: Radiation propagation has evolved from pen and pencil studies using tables of cross sections and of mathematical functions to large and complex codes written and maintained by highly-skilled teams. The author’s pilgrimage through this process; from his pencil-and-paper days while on Enewetak Atoll in 1956 to spherical-harmonics transport codes, the use of Sn and Monte Carlo codes, to an analytical transport code used for the calculation of cosmic-ray propagation through solar-system atmospheres ranging from Earth to Titan, and finally to a Monte Carlo transport code to treat cosmic-ray transport through the heliosphere will be described. The applications of these calculations include the radiation from radioactive fallout, beta-ray transport, accelerator shielding, hospital physics, cosmic-ray ionization, cosmogenic isotope production, the radiation dose to air crew, radiation dose to space crew and cosmic-ray fluxes to spacecraft. Some examples of the results of these calculations will be given.