AbstractID: 9697 Title: Bremsstrahlung electron distribution -- an analytic formula

The photon distribution in bremsstrahlung is given analytically by the Schiff formula, which integrates over all outgoing electron directions to get the resulting photon spectrum in each direction. But there is no corresponding expression for the scattered electron distribution due to the bremsstrahlung interaction. While the photon distribution is important in the photon beam target, the electron distribution contributes to the dispersion of high-energy electrons in the medium. An analytic formula for this electron scatter may be useful for studying the effects of large-angle scatter on the multiple-scattering theory and for comparison to Monte Carlo results. This paper presents an analytic calculation of the bremsstrahlung electron distribution obtained by integrating over outgoing photon angles. This distribution gives the electron spectrum as a function of scatter angle. From it the mean energy of the scattered electron can be easily obtained. The ratio of bremsstrahlung cross section (integrated over electron energy) to the Mott cross section is presented as a function of angle. Bremsstrahlung scatter predominates at large scatter angles, and the mean energy of the scattered electrons is over half the incident energy up to 20 MeV. The formula is based on the Heitler equation, and is correct in the high-energy limit. Work is under way to compute the exact distribution for all energies.