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Cross section of non-relativistic Bremsstrahlung radiation in a dispersive and absorbing medium MARZIEH ZARE, University of North Texas, JAVAD USEFIE MAFAHIM, Shahid Bahonar University of Kerman, Iran — Starting from the quantized version of Maxwell's equations for the electromagnetic field in an arbitrary permeable and linear Kramers-Kronig dielectric, Bremsstrahlung radiation is studied in a dispersive and absorbing medium. Introducing the new interaction Hamiltonian, different from the one in the free space, the cross section for Bremsstrahlung radiation and indeed the probability of the interaction between a projectile particle, like an electron, and a nucleus is calculated using Fermi's golden rule. To investigate the difference between the scattering cross-section in the presence of a dispersive and absorbing medium and the one in free space, we defined a quantity that is the ratio of the scattering cross-section in this medium to the cross-section in free space. This ratio was computationally analyzed in the positive and the negative refractive index medium and since there are dielectric and permeability functions, two resonance frequencies are observed. Far from the resonance frequencies, this limit approaches to one. In general, for this interaction cross section we can trust the cross section in free space except around the resonance frequencies of the medium.

Marzieh Zare
University of North Texas

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