Study on the Far-Field Diffraction Characteristics of a Spectral Dependent Lorentzian Lineshape Pulse

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ABSTRACT

Spectral line''s production will be changed after diffraction of different kinds of apertures. This treatise is discussing what''s the effect of the far-field diffraction to a spectral dependent Lorentzian lineshape pulse, which includes slit, rectangular aperture, and triangular aperture etc. After progressing the analysis, spectral line which in front of aperture center was discovered that it would produce blue-shift more possibly when linewidth is getting wider. Besides, when linewidth is set and k is π/2, spectral line would not shift. On the same condition, when k is smaller than π/2, spectral line would occur blue-shift. However, when k is bigger than π/2, spectral line would occur red-shift. Moreover, the wider apertures, the faster spectral line changes. Triangular aperture has the same horizontal direction with slit, and rectangular aperture, only line profile on the spectral line is narrower, and further, intensity is smaller when it goes to the higher frequency from vertical direction. Line profile on the spectral line would become more irregular, and further, intensity though not high, stay in nonzero condition when it goes to the higher frequency from 45-degree angle slope direction.

Keywords : Lorentzian Lineshape Pulse ; Slit ; rectangular aperture ; triangular aperture ; blue-shift ; red-shift ; Far-Field Diffraction

Table of Contents

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