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Title:Effect of ripple taper on band-gap overlap in a coaxial Bragg structure operating at terahertz frequency
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Abstract:Based on the mode-coupling method, numerical analysis is presented to demonstrate the influence of ripple taper on band-gap overlap in a coaxial Bragg structure operating at terahertz frequency. Results show that the interval between the band-gaps of the competing mode and the desired working mode is narrowed by use of positive-taper ripples, but is expanded if negative-taper ripples are employed, and the influence of the negative-taper ripples is obviously more advantageous than the positive-taper ripples; the band-gap overlap of modes can be efficiently separated by use of negative-taper ripples. The residual side-lobes of the frequency response in a coaxial Bragg structure with ripple taper also can be effectively suppressed by employing the windowing-function technique. These peculiarities provide potential advantage in constructing a coaxial Bragg cavity with high quality factor for single higher-order-mode operation of a high-power free-electron maser in the terahertz frequency range.
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