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Title:Enhanced reflection in one-dimensional mostly-hollow metallic gratings at terahertz frequencies

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Abstract:Enhanced transmission through metallic gratings with narrow slits is a well-known phenomenon for TM polarized waves at optical and microwave frequencies. A similar though fundamentally different phenomenon, i.e., enhanced reflection at terahertz frequencies, is reported here for the geometrical complement of the structure with narrow slits. The latter phenomenon cannot be related to the former by Babinet's principle, as their origin is quite different, and both are observed for the same polarization. This phenomenon is explored by studying the field profiles within the grating, and is attributed to the presence of TM cavity modes at specific frequencies. A simple formula is given to anticipate the frequencies at which the anomalies appear. The accuracy of this formula is verified by using a rigorous numerical approach.

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