Propagation of γ-rays in periodical "optical" medium of 178Hf with inverse population of nuclear levels

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Abstract

A process of nuclear superfluorescence in a three-level periodical "optical" medium of 178Hf is theoretically simulated. The formalism of Maxwell-von Neumann equations in terms of Schrödinger representation is used to solve the problem. The time shape of the superfluorescent γ-pulse formed in the nuclear diffraction channel is calculated under the conditions of two-wave diffraction in the Bragg geometry as a function of effective medium thickness, deviations from the Bragg conditions, and lifetime of the 178Hf nucleus at the lower working level. © 2007 by Allerton Press, Inc.