

Abstract Submitted
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Making Pb look like Au via coherent control: Shaping driving laser pulses to induce an arbitrary HHG spectra¹ DENYS BONDAR, Princeton Univ, ANDRE CAMPOS, Max Planck Institute for Nuclear Physics, RENAN CABRERA, HERSCHEL RABITZ, Princeton Univ — We show that a laser pulse can always be found that induces a desired optical response (i.e., high harmonic generation – HHG) from an arbitrary physical systems. As illustrations, driving fields are computed to induce the same HHG from a variety of distinct systems (open and closed, quantum and classical). These results may be viewed as realizing an aspect of the alchemist dream to make different elements or materials look alike, albeit for the duration of a control laser pulse. The developed approach reveals unexplored flexibilities of nonlinear optics that may have many implications: The observed induced dipolar spectra without detailed information on the driving field turns out not to be sufficient to characterize atomic and molecular systems. The constructed approach may also be applied to design materials with specified optical characteristics. The ability to control nonlinear optical response may enable to discriminate nearly identical quantum systems. The latter problem is inspired by the challenges in the life sciences.

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