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# A non-linear mapping from photo-electron spectra to pulse shape

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Strong field quantum dynamics are very sensitive to the shape of the interacting field. Finding a suitable pulse shape to reach a predefined target lies in the heart of quantum control. The forward non-linear mapping between the interacting pulse and the objective (photo-electron spectra(PES)) can be achieved by solving the time-dependent Schrödinger equation. However, the non-linear inverse mapping i.e. a mapping from the PES to the pulse shape is not straightforward. In this work, we have explored the non-linear inverse mapping using the artificial neural network. As a test system, we have studied quasi-resonant two-photon ionization of a helium atom for the interaction with different pulse shapes of the same energy and same frequency content.

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