Nazarkin, Netz, and Sauerbrey Reply: In their Comment [1] Shore *et al.* suggest that our proposal [2] to maintain phase memory in a two-level system, in which decoherence due to field-induced coupling to a decaying state or continuum is controlled by an additional field, is not new. The main point of their argumentation is that our proposal is what has been known for many years as a laser-induced continuum structures (LICS). Analysis of the relevant literature [3–6] reveals, however, that the LICS technique is actually focused on another problem: creating a transparency window in the continuum through interference between two ionization channels. The process is described by a three state system, where the upper state represents the continuum. In its physical essence the LICS method is closely related to such quantum interference phenomena as electromagnetically induced transparency (EIT) [7], dark states, and population trapping in a Λ system. In contrast, we discuss how the underlying general mechanism (e.g., population trapping) may be explored to create a coherent phase memory. That the creation of phase memory does not simply reduce to the problem of decoherence suppression under the conditions of LICS or within a Λ system, as Shore *et al.* claim, is clear from the fact that in the regime of complete elimination of the upper state decay due to population trapping, these systems do not exhibit any memory in the sense that their evolution depends on their previous quantum states. In fact, the systems only maintain mutual coherence of the two lower lying bound states, but do not remember the laser-atom interaction prehistory, which is of great contemporary interest for quantum computation and information processing. We found that this is the case when such systems are combined with a two-level system. The use of the LICS technique to reduce ionization from the upper resonant level of a two-photon transition was previously discussed in the context of resonant four-wave mixing and third harmonic generation [3,5]. However, the incoherent interaction regime studied there (the regime of pulse durations much longer than the macroscopic dephasing time due to collisional and Doppler broadening) is irrelevant to the situation discussed in our paper and cannot lead to the coherent memory effect. Shore *et al.* claim that the model we use is insufficient to describe the continuum correctly. We did not attempt to address all the issues of the interaction with continuum. The model treats correctly the excitation of an autoionizing state which weakly interferes with the photoionization channel, and the interaction with a structureless continuum with a small value of the asymmetry parameter [4]. That the model is quite realistic is obvious from the fact that precisely these two situations describe the recent experiments, where a significant population trapping was observed [5–7].

We agree with Shore *et al.* that in a real experiment additional complications (incoherent channels, matching of spatiotemporal intensity distributions, dynamic Stark shifts) may mask the desired effect, and only specific systems could exhibit the expected coherent behavior. This suggests that the observation of the proposed memory effect is a challenging problem which will require considerable efforts and adequate experimental methods. A real-time study using the pump-probe technique (rather than the spectral approach typical of LICS experiments) in combination with well-developed methods for laser pulse shaping could give an answer to this question.

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