Rogue waves have received considerable interest recently [1-7]. The sudden formation of extreme waves in the ocean is well reported, and no longer doubted in the scientific community [1]. Besides the trivial linear superposition principle of waves, one possible mechanism explaining the formation of rogue waves, characterized being strongly localized, is the modulational instability of weakly nonlinear monochromatic waves, first discovered in water waves [8]. This instability can be modeled within the framework of the nonlinear Schrödinger equation (NLS) [9,10], an evolution equation, which describes the dynamics in time and space of wave trains in waters of finite and infinite depth [2]. Within the class of exact breather solutions on finite background [11,12] there is a hierarchy of both in time and space localized solutions [13-15], which amplify the amplitude of the carrier by a factor of three and higher. Owning these properties, the latter are considered to be appropriate solutions to describe the formation of rogue waves [3,16]. Recent observations of these doubly-localized NLS solutions in optics [17], in water waves [18-20] and in plasma [21] confirmed the ability of the NLS to model strong localizations in nonlinear dispersive media and justified the choice of the NLS approach. In this paper, we study the implication of the time-reversal invariance of the NLS equation and we propose a new way to experimentally focus both in time and space rogue waves using the principle of the time-reversal mirrors that was first extensively studied for acoustic and elastic waves [22]. In a standard time-reversal experiment, the wave field radiated by a source is first measured by an array of antennas positioned in the far field of the source and then time-reversed and simultaneously rebroadcasted by the same antenna array. Due to the time-reversal invariance of the wave process, the reemitted wave field focuses back in space and time on the original source, whatever the complexity of the propagation medium. The effect of dispersion [23,24] and nonlinearities [25] has been experimentally studied for acoustic waves, and it has been shown that the time-reversed field focuses back in time and space as long as nonlinearities do not create dissipation, i.e. as long as the propagation distance is smaller than the shock distance. Time-reversal in water waves has also been recently confirmed [26], however, the nonlinear effects were negligible in this last study.

We confirm experimentally the refocusing of the time-reversed field of doubly-localized NLS breather rogue wave solutions, related to the modulational instability. The presented results are in excellent agreement with theory and show that the latter technique can be applied to nonlinear waves, which propagate in a wide range of nonlinear dispersive systems described
by the NLS, and may be used to analyze and predict rogue wave dynamics.

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