Preservation of the identities of multiple overlapping solitons through a collision with a strong integrability-breaking barrier[1] VANJA DUNJKO, MAXIM OLSHANII, Department of Physics, University of Massachusetts Boston, Boston, MA 02125 — We show that when a strongly-coupled "breather" of the nonlinear Schrödinger equation is scattered off of a nonperturbatively strong barrier, the solitons constituting the breather survive the collision. As the barrier height is lowered with impact speed held constant, at first all solitons are fully reflected; then suddenly the smallest soliton starts being fully transmitted; after the barrier is lowered some more, suddenly the next smallest soliton begins being fully transmitted as well, etc. Why the constituent solitons survive the integrability-breaking collision process is at present a mystery.

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Date submitted: 31 Jan 2014   Electronic form version 1.4