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Soliton formation during the cooling, merging and splitting of BECs¹

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Bose-Einstein Condensates are a powerful tool for the study of nonlinear dynamics. In our experiments we investigate the formation and dynamics of dark solitons in a variety of different settings. First, we observe soliton trains as a result of quantum shock (dispersive shock) during the merging of two BECs. Second, when a BEC is split into two parts by a repulsive barrier, a transition from sound formation to shock generation and solitons is observed with increasing barrier strength. Third, we also observe soliton formation during the creation of a BEC when the transition from non-condensed atoms to a BEC is crossed sufficiently rapidly. In this talk I will describe our ongoing experiments investigating such dynamics.

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