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The fate of a gray soliton in a quenched Bose-Einstein condensate OLEKSANDR GAMAYUN, Lancaster Univ, YULIA BEZVERSHENKO, Bogolyubov Institute for Theoretical Physics, VADIM CHEIANOV, Leiden University — We investigate the destiny of a gray soliton in a repulsive one-dimensional Bose-Einstein condensate undergoing a sudden quench of the non-linearity parameter. The outcome of the quench is found to depend dramatically on the ratio η of the final and initial values of the speed of sound. For integer η the soliton splits into exactly $2\eta - 1$ solitons. For non-integer η the soliton decays into multiple solitons and Bogoliubov modes. The case of integer η is analyzed in detail. The parameters of solitons in the out-state are found explicitly. Our approach exploits the inverse scattering method and can be easily used for the similar quenches in any classical integrable system.

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