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Bose Fireworks in Driven Bose-Einstein Condensates. LEI FENG, LOGAN CLARK, ZHENDONG ZHANG, ANITA GAJ, JIAZHONG HU, CHENG CHIN, James Franck Institute, Enrico Fermi Institute and Department of Physics, University of Chicago, Chicago, IL 60637, USA — We present our recent studies of non-equilibrium dynamics in Bose-Einstein condensates with modulated atomic interactions. By oscillating the s-wave scattering length in the condensates, we observe collective emission of matter-wave jets due to stimulated inelastic collision. Correlations between the emitted atoms show that the jet structure comes from the quantum fluctuations of the Bose condensate. Increasing the driving amplitude, we observe higher-order harmonic generation of the matterwave jets. The process is analogous to four-wave mixing in quantum optics. We further observe intricate correlations between all emitted jets, which demonstrate the intriguing dynamics of a strongly driven quantum system.

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