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Three-Wave Resonant Interaction of Bogoliubov Excitations in a Bose-Einstein Condensate with Diffraction

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Abstract: We investigate the three-wave resonant interaction (TWRI) of Bogoliubov excitations in a disk-shaped Bose-Einstein condensate with the diffraction of the excitations taken into account. We show that the phase-matching condition for the TWRI can be satisfied by a suitable selection of the wavevectors and the frequencies of the three exciting modes involved in the TWRI. Using a method of multiple-scales we derive a set of nonlinearly coupled envelope equations describing the TWRI process and give some explicit solitary-wave solutions.

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Key words: soliton, three-wave resonant, diffraction

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