

SCATTERING HALOS AND LOSS OF COHERENCE IN REFLECTING  
BOSE-EINSTEIN CONDENSATES

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Previous studies of the Gross-Pitaevskii equation have established that inter-atomic interactions can disrupt the internal structure of reflecting Bose-Einstein condensates [1,2]. We now go beyond mean-field theory by using the truncated Wigner method to investigate the production of scattering halos and the associated depletion of the condensate [3]. Our calculations predict that scattering halos are most pronounced for fast-moving, dense, cigar-shaped BECs, in agreement with the experimental observations [4]. We discuss the consequences for reflection probabilities, and the wider implications of our work, in particular for interferometry [5,6].

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