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Maksym Pryporov* (pryporov@iastate.edu), Iowa State University, Department of Mathematics, 400 Carver Hall, Ames, IA 50011. *Error estimate for the Bloch band-based Gaussian beam superposition for the Schrödinger equation.*

This work is concerned with asymptotic approximation of a semi-classical Schrödinger equation in periodic media. For the underlying equation, subject to a highly oscillatory initial data, a hybrid of the WKB approximation and homogenization leads to the Bloch eigenvalue problem and an associated Hamilton–Jacobi system for the phase in each Bloch band. We formulate a superposition of Bloch-band based Gaussian beams to generate high frequency solutions to the original problem. For initial data of a sum of finite number of band eigen- functions, we prove that the Gaussian beam superposition converges to the original wave field at a rate of $\varepsilon^{1/2}$ as long as the initial data for Gaussian beam components in each band are prepared with same order of error or smaller. (Received February 14, 2012)