

# Multiscale asymptotic expansions for travelling wave packets in periodic media

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## **Abstract**

Starting from the wave equation for a medium with material properties that vary periodically, I shall discuss a system of recurrence relations that describe propagation of wave packets that oscillate on the microscale (*i.e.* on lengths of the order of the period of the medium) and vary slowly on the macroscale (*i.e.* on lengths that contain a large number of periods). The resulting equations contain a version of the geometric optics and the overall energy transport description for periodic media. I shall then illustrate the developed asymptotic theory using the example of a point pulse propagating through a periodic arrangement of two materials with highly contrasting elastic moduli.