1067-35-1057 **Guenbo Hwang*** (ghwang@cems.uvm.edu), Department of Mathematics and Statistics, University of Vermont, Burlington, VT 05401, and **Triantaphyllos R Akylas** and **Jianke Yang**.

Linear Stability of Gap Solitons in One-dimensional Periodic Media.

We study the linear stability of gap solitons in periodic media described by the nonlinear Schrödinger equation with a periodic potential. Motivated by our numerical evidence that the eigenvalue near band edges is indeed exponentially small, we use the exponential asymptotic method to calculate this small eigenvalue of the linear stability problem. By means of the exponential asymptotics, two branches of gap solitons bifurcate from band edges, referred to as on-site and off-site gap solitons. We show that on-site gap solitons are linearly stable while off-site gap solitons are unstable. In addition, we compare the analytical eigenvalue formulae with those obtained numerically. The comparisons show perfect agreement between the analytical results and the numerical values. (Received September 17, 2010)