Density of Phonon States in an FCC lattice

This curve shows the phonon density of states for the fcc lattice, assuming nearest neighbor spring forces between atoms. The model used is the same as in Qu. 2 and Qu. 3 of homework 2. The frequency is in units of the maximum phonon frequency given by $2\sqrt{2K/M}$. Also shown is the density of states in the Debye theory, where the Debye frequency has been adjusted to give the correct density of states at low frequency. The cut-off in the Debye theory is then determined by the requirement that the area under the curve is equal to 3.

Phonon Density of States, fcc lattice