Electrons in 10 periodic potentials: What have we leased?
- Wave Sunctions of electrons in periodic potentials can be written as!
$\Psi_{k}(x) = U_{k}(x)e^{ikx}$, $k = \frac{2\pi}{Na}n$, $n \in \mathbb{Z}$
- Electrons in a periodic potential form bands
* Continuous (actually dense but discrete ::) set of allowed energies for different k Separated by gaps
- Can describe Hamiltonians and wavefunction by expanding in an appropriate basis
* we saw place waves and atomic orbitals
Solving S.E. becomes a matrix diagonalization problem
- Green's functions can be used to describe properities of system
* Total and projected DOS
* Every eigenvalues (poles of Green's function)
- Combining bands with semiclassical fields gives insight into transport
* electrons in bands act under fields as if they have crystal momentum and effective moss