Spin wave : Excitation of single spin would not remain localised on that very spin but will shared by whole system of spins through exchange interaction between them . So excitations propagate through the system of spin in a wave like form and are called Spin waves or when quantised say , Magnons .It is a quasiparticle , a collective excitation of the electrons spin structure in a crystal lattice .

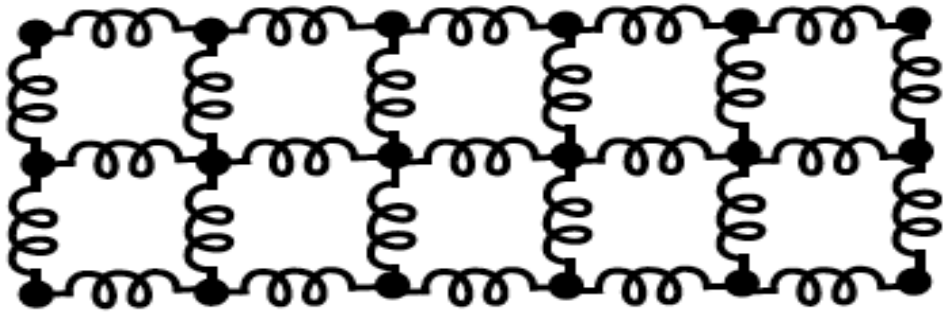
Phonons and magnons are quasi-particle associated to the lattice and spin excitations .

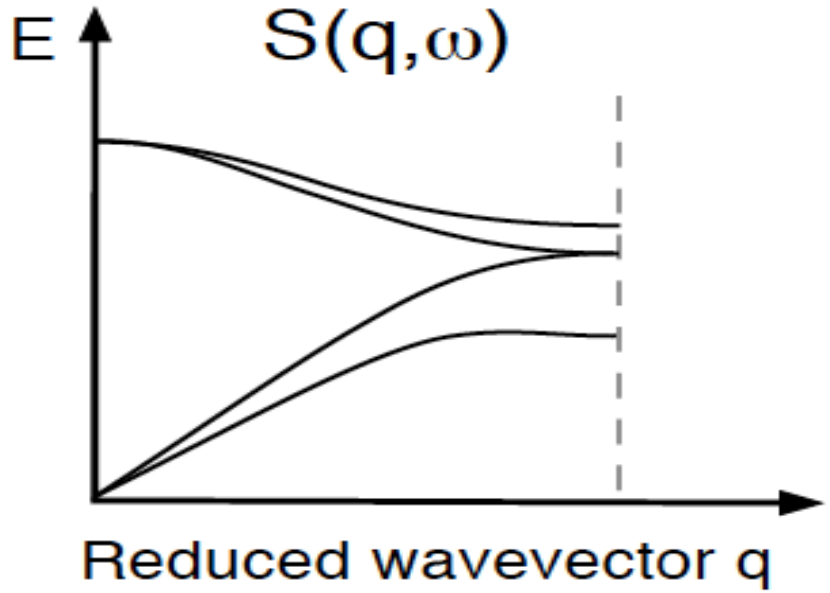
They are characterized by a frequency and a wave vector q .

Dispersion relationship between energy !ù and momentum !q .

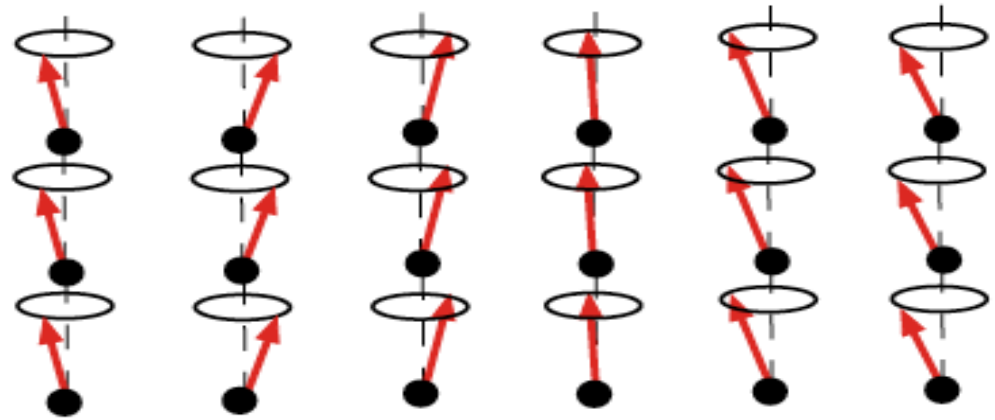
Magnons and phonons are **BOSONS**, and they are described by *symmetric wavefunction with respect to the exchange of particle positions .*

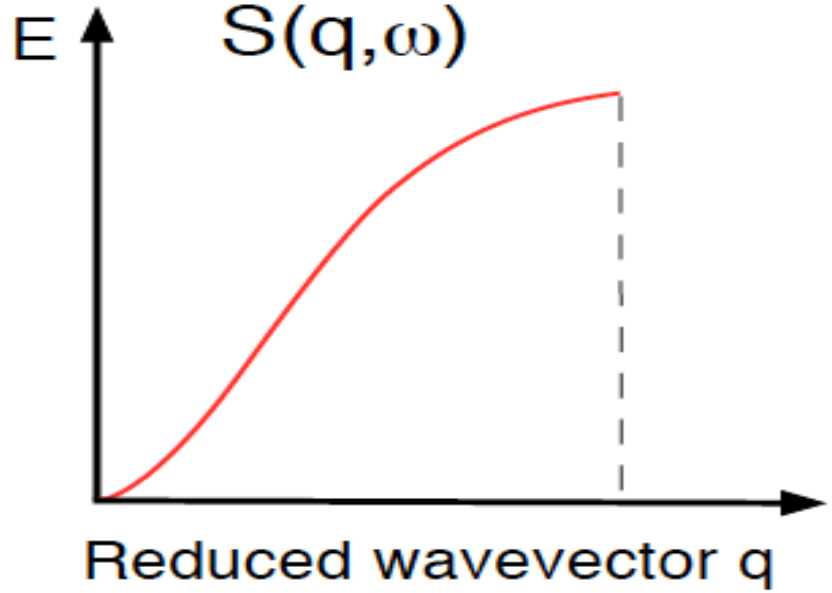
Phonons





Magnons



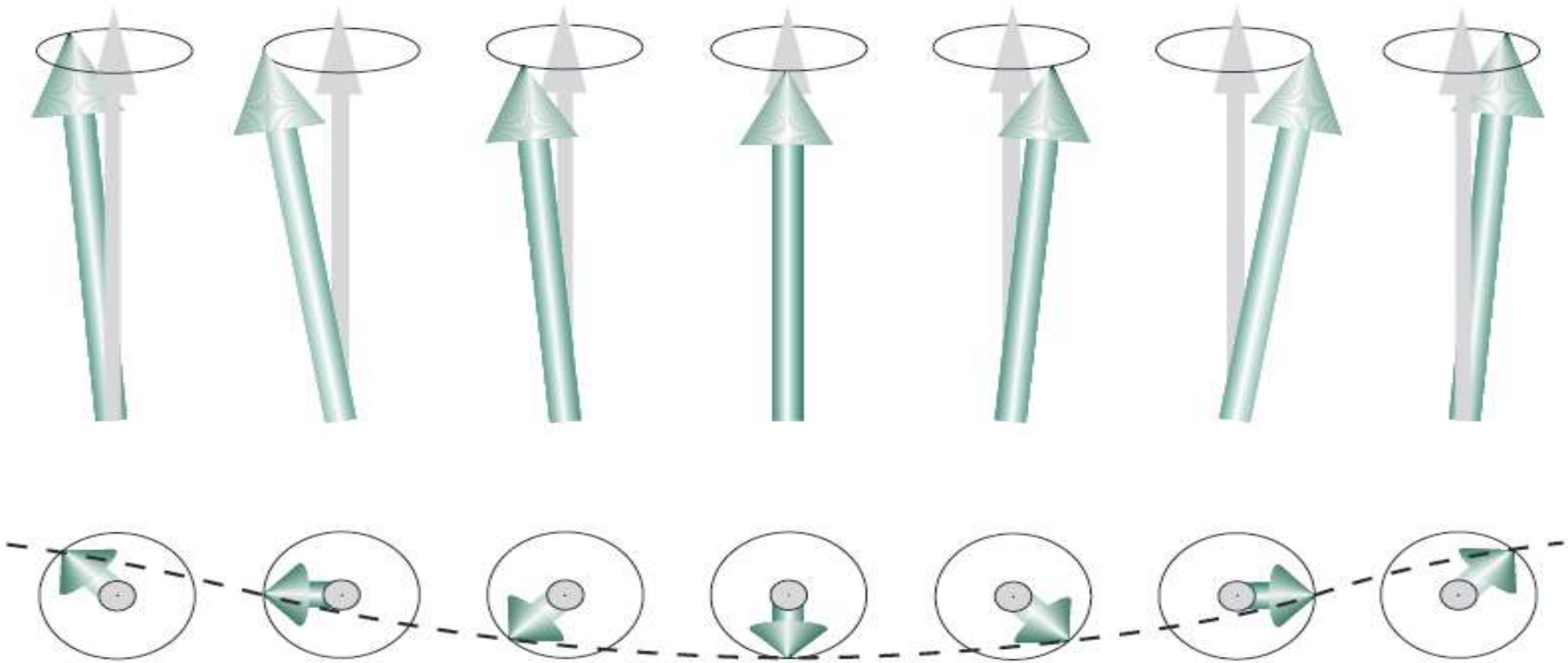


Lattice waves => Phonons

Collective acoustic and optic lattice vibrations .

Spin-waves => Magnons

Collective magnetic excitations associated to the in-phase precession of the spin moments .



Magnons are bosonic modes of spin lattice that corresponds roughly to the phonon excitations of the nuclear lattice .

As temperature is increased ,

the thermal excitation of spin waves reduces a frromagnet’s spontaneous magnetisation .