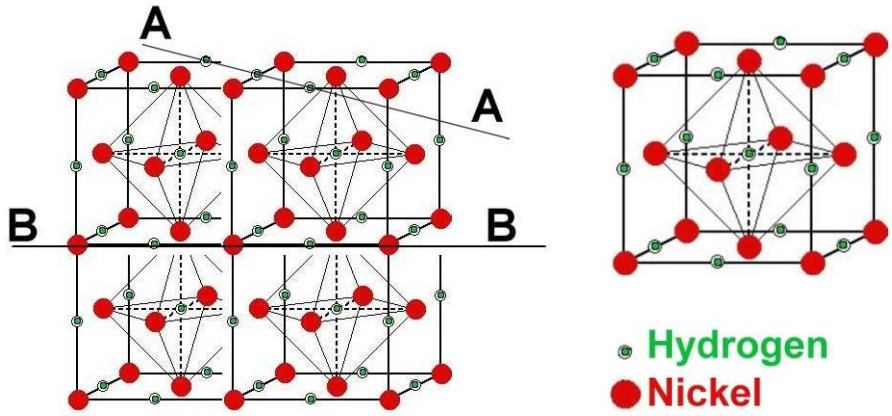
Hydrogen resonance in Nickel crystal lattice.

I was thinking about the words “coherence” and “resonance”.
What kind of “coherence”?
What kind of “resonance”?

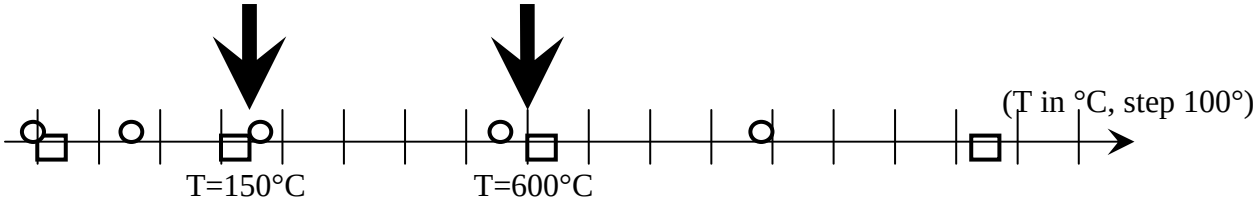
(1)-
In the Nickel lattice (FCC), Hydrogen assumes fixed positions.



Distances between H atoms:
along A-A (the diagonal): 0.249nm;
along B-B (sides): 0.352nm.

(2)-
Under the effect of temperature, H atoms acquire a De Broglie wavelength due to their motion.
De Broglie wavelength associated with (for example.) thermal neutrons is lambda = h/sqrt(3mkT)
Here mass m is about m = 1.67x10**(-27) kg.
With some steps we get:
T (°C) = 6.3 / (lambda**2) – 273
(lambda in nm).

(3)-
I can suppose some sort of “coherence” and “resonance” when the distance between the H atoms is equal to an integer number of De Broglie wavelength (i.e. De Broglie waves are “in phase”).
So as “temperature of resonance" we can assume that temperature at which lambda is (1 / N) the distance between atoms. Example: along the diagonal T (°C) = 6.3 / (0.249/N)**2 – 273.
From this, we can evaluate the “temperature of resonance" for various N, both along the lattice diagonals and along the lattice sides. With some calculation we get these squares and circles:



A good region is around 150°C. The next region is around 600°C.
In the middle, De Broglie waves will be “out of phase”.