Variable Atomic Radius of Hydrogen Due to Vibrating Nucleus
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The H-atomic radius is variable because the H-nucleus is vibrating and the electric
force field upon the electron is repeatedly changing due to the changing distance
from the positive nucleus to the negatively charged electron. If the distance
from the nucleus to the electron is $d = r + A\cos2\pi ft$ where $r = 5.29 \times 10^{-11} m$,
the calculated Bohr radius, and $d = 2.5 \times 10^{-11} m$, the measured atomic radius of
the H-atom, then the equation for the variable atomic radius of the H-atom is
$5.29 \times 10^{-11} m + A\cos2\pi ft = 2.5 \times 10^{-11} m$. If the RMS value for the average cosine
is 0.707, solving for $A$, the average amplitude of nuclear vibration, $A = 3.95 \times 10^{-11} m$.
Therefore, the oscillating orbit of the electron in an H-atom has an average amplitude
of $A = 3.95 \times 10^{-11}$.