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Reconciliation of Values for Bohr Radius and Empirical Radius of H-Atom Using Nuclear Vibration Factor STEWART BREKKE, Northeastern Illinois University (former grad student) — The value for the calculated H-atom radius, the Bohr value, is $5.29x10^{-11}m$ and the empirical value for that radius has been found to be $2.5x10^{-11}m$. Since the nucleus is vibrating, the distance relation, d, between the nucleus and the electron is $r + A cos 2\pi ft = d$, due to a slight lag time between nuclear vibration and orbiting electron repeatedly changing the distance between the vibrating nucleus and the electron. Therefore, the distance between vibrating nucleus and orbiting electron must only be an average distance. The average value for the cosine is the RMS value of 0.707. Substituting the calculated distance for r and the empirical distance for d, the equation becomes $5.29x10^-11m + (0.707)A = 2.5x10^{-11}m$. Solving for the average amplitude of nuclear vibration, A, $A = 3.95x10^{-11}m$.

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