

Theory of atom

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February 28, 2023

1 Hydrogen

1.1 Stability

The hydrogen atom is bound together by Coulomb potential $1/r$. From Virial theorem, we will find not all attractive potentials lead to stable bound states. Specifically, $1/r^2$ or $1/r^3$ doesn't give us bound states in 3D. This can be shown by calculating $T + V$: if it's greater than zero for the whole spectrum, then of course we don't have stable bound states.