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# Normalization of units relative to .

* Normalized Units, such that
* mass:
* length:
* time:

are normalized in terms of ***c*** and ***G*** , we have a universal and absolute scale for these quantities.

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# Generalized Wave Function

* Wave Function:
  + - The generalized wave function can describe the state of a system in these normalized units.
    - The magnitude squared of the wave function, , gives the probability density, and integrating this over all space gives the total probability, which is normalized to 1.

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| **Equation # - Normalization of GWF** |

# Absolute Energy Calculation

* Expectation Energy:
* Using the wave function, we can calculate the expectation value of the energy \langle E \rangle of the system.
* This involves integrating the Hamiltonian over the entire region, weighted by the probability density .

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| where: |
| * + is the wave function of the system.   + is the complex conjugate of the wave function.   + is the Hamiltonian operator, which includes the kinetic and potential energy terms.   + ***dV*** is the volume element in the space of the system. |
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| **Equation # - Absolute Energy Equation** |

\Psi(x,t,d) = R(t) \cdot (\cos(kx - \omega t) + i^d \sin(kx - \omega t))