DERIVING TISE PROBABILITY CLOUDS USING QWST

Selected Investigation – TISE Probability Clouds using QWST

In standard quantum mechanics, the shapes of atomic orbitals (s, p, d, etc.) derive from the time-independent Schrödinger Equation (TISE). These are usually introduced as purely mathematical wavefunctions $\psi(r, \theta, \varphi)$, whose squares $|\psi|^2$ yield "probability clouds." Quantum Wavespace Theory (QWST), however, interprets these distributions in terms of real, physical wave phenomena—partial reflections, nodal shells, and wave superpositions within a wave-based medium.

This investigation demonstrates how a QWST wavefunction can generate orbital-like shapes. Instead of simply postulating a probability amplitude, we define explicit wave factors such as:

$$cos\big(n \cdot \pi \cdot (r^2/\lambda)\big) \cdot cos(m \cdot \varphi) \cdot exp(-r^2/a^0)$$

Where $r^2 = \sqrt{((R - R^0)^2 + Z^2)}$ in cylindrical coordinates,

Orbital-Like Clouds in QWST:
We produced spherically symmetric clouds (similar to 1s) by summing wave energies over random orientations. With a single orientation, a toroidal or cylindrical wave pattern could yield a two-lobe shape (similar to a p orbital).

Wave Logic vs. Probability Logic:
Where standard QM says "the electron is not a path but a probability amplitude," QWST constructs physically real wave structures (toroidal flows, nodal shells). The final 3D scatter becomes visually identical to TISE orbital clouds but grounded in a mechanistic wave concept.

Interpretation and Significance:
As an alternative to the dependence on abstract wavefunctions, QWST's wave geometry naturally demonstrates:

1) discrete nodal structures corresponding to quantum numbers,
2) familiar orbital shapes such as s-like or two-lobe p-like patterns.

In short, QWST's wave logic, applied to a "toroidal or cylindrical shell" framework, can recover both the radial and angular features of atomic orbitals. That confirms QWST can replicate known atomic physics in a wave-mechanical manner, linking fundamental pressures and nucleon radius r_0 to the same geometry that standard quantum mechanics encodes in $\psi(r, \theta, \varphi)$.

TISE and QWST Hydrogen Cloud Comparison (Plotted in MATLAB)

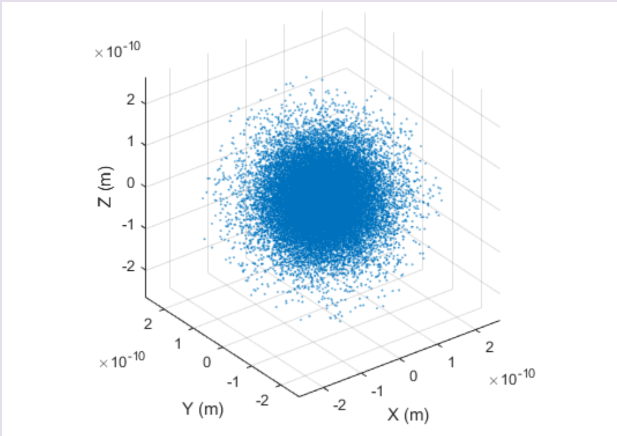

Figure 1: TISE Hydrogen 1s1s1s **Probability Cloud**
A standard Schrödinger (TISE) solution for the hydrogen 1s orbital, with points colored uniformly. The electron's likely locations are directly sampled from $|\psi|^2$ in spherical coordinates, resulting in a spherically symmetric cloud.

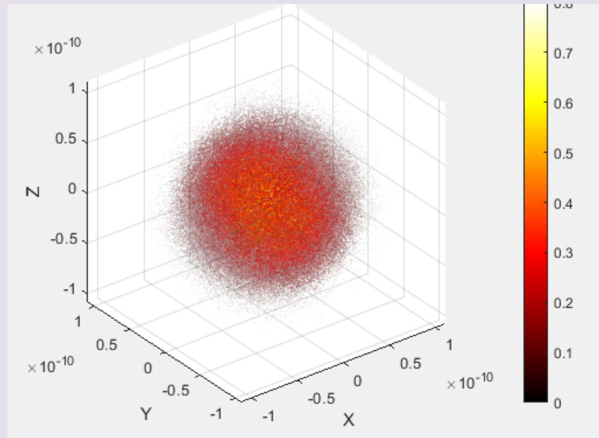

Figure 2: QWST Donut n=2, **Integrated Steps**
A QWST electron wave plot in which the toroidal shape is rotated through multiple random angles and summed, yielding an overall spherical distribution. Each individual donut orientation contributes to the final 'cloud' of possible positions.

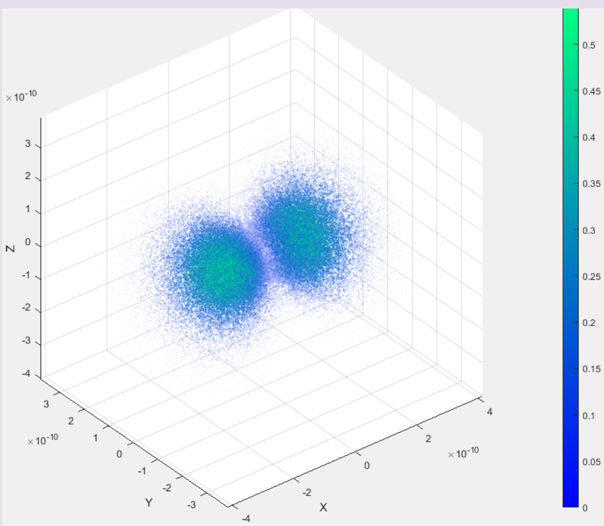

Figure 3: TISE Hydrogen 2p **Orbital**
A two-lobe Schrödinger (TISE) orbital, here specifically 2p, showing probability concentrated in two opposite lobes. Points were sampled via acceptance–rejection from the TISE wavefunction.

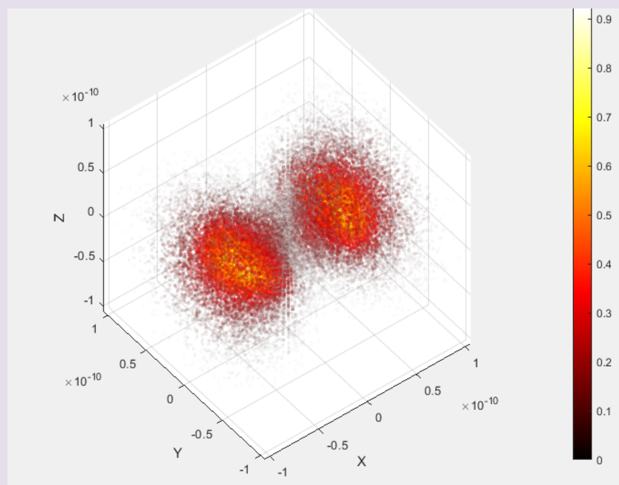

Figure 4: QWST Two-Lobe Wave (n=1, m=1)
A wave-based QWST electron plot producing two primary lobes along ±x. The color scale indicates wave amplitude, with the red regions marking the highest probability (or wave intensity).

TISE and QWST Hydrogen Cloud Comparison (Plotted in MATLAB)

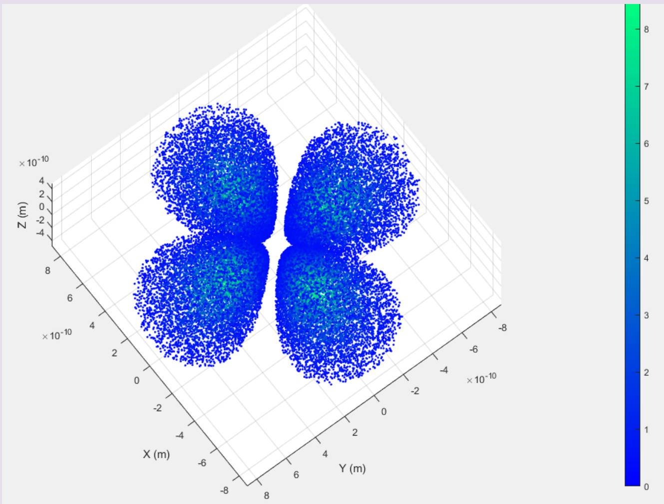

Figure 5: TISE $d_{x^2-y^2}$ Orbital
A 'four-lobe' TISE orbital at higher quantum numbers $(n = 3, \ell = 2)$ After thresholding out lower-amplitude points, the four main lobes along ±x and ±y become visible.

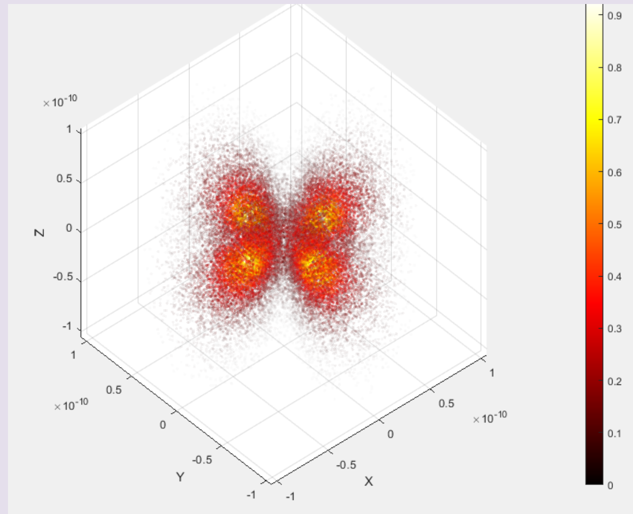

Figure 6: QWST Four-Lobe Wave (m=2)
QWST electron wave with $m = 2\ in\ \cos(m\phi)$, generating four azimuthal lobes. Again, we see a strong match to the TISE geometry but rooted in toroidal wave logic.

QWST Hydrogen Clouds Highlighting Toroidal Patterns (Plotted in MATLAB)

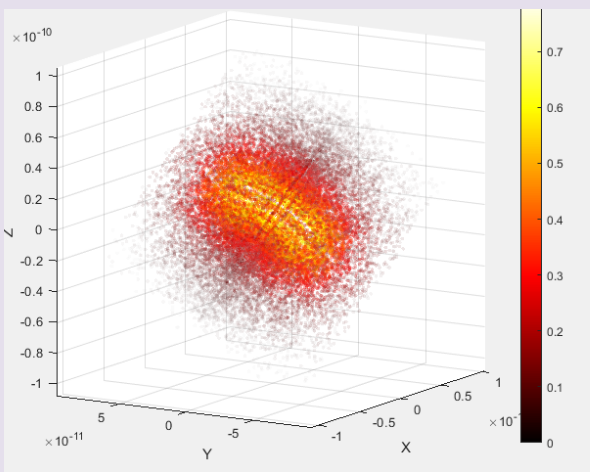

Figure 7: Single-Step QWST Donut
An individual snapshot of the QWST donut wave (before summing rotations). This reveals the core toroidal ring structure of the electron's wave, which—when viewed from random angles over time—forms a sphere.

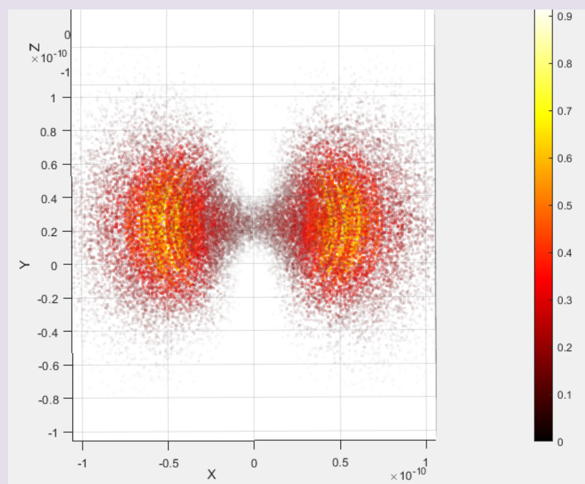

Figure 8: QWST Two-Lobe Detail
A closer look at the QWST two-lobe wave. Note the faint 'radial lines' of highest amplitude, tracing out the toroidal ring 'footprints' in each lobe. Summing multiple time steps randomizes these lines into a continuous distribution.