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phys 425 &01
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$Assumptions = {x, t, m, ω, ℏ, p, a, n, c0, r, θ, ϕ} ∈ Reals
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$(x \mid t \mid m \mid \omega \mid \hbar \mid p \mid a \mid n \mid c_0 \mid r \mid \theta \mid \phi) \in \text{Reals}$

$$\psi_{2,1,1}[r, \theta, \phi] := \left(-1 * \sqrt{\frac{3}{(8 * \pi)}}\right) * \left(\sqrt{\frac{1}{24 * a^3}}\right) * \left(\frac{r}{a}\right) * \left(e^{-\left(\frac{r}{2*a}\right)}\right) * \left(e^{-(i*\phi)}\right) * \mathrm{Sin}[\theta]$$

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(*We know that the Bohr radius is greater than zero.*)
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$$\text{Assuming}\left[a > 0, \text{Integrate}\left[(r * \mathrm{Sin}[\theta] * \mathrm{Cos}[\phi])^2 * \mathrm{Abs}[\psi_{2,1,1}[r, \theta, \phi]]^2 * (r^2 * \mathrm{Sin}[\theta]), \{r, 0, \infty\}, \{\theta, 0, \pi\}, \{\phi, 0, 2 * \pi\}\right]\right]$$

$12\, a^2$

$\text{Integrate}\left[\mathrm{Sin}[x]^2, \{x, 0, 2 * \pi\}\right]$ (* Just to confirm the integral.*)

π