Chem. 540
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PROBLEM FORMALISM 17

Consider a particle described by the wavefunction

$$\Psi(x) = a\, e^{-bx^2}.$$

(a) Normalize this wavefunction.
(b) Calculate the probability of finding this particle between 0 and ∞.
(c) Calculate the average position of this particle.
(d) Calculate the expectation value of $\hat{x}^2$.
(e) Is this particle in a state of definite momentum?
(f) Calculate the wavefunction of the particle in momentum space.