

PHYS 4310, Quiz 2

1. Momentum, \vec{p} , is a vector. Reconcile that notion with the de Broglie relationship which equates momentum to h/λ .

2. In 1773, Benjamin Franklin investigated how oil could “calm” water near a pond in London. He found that a few cm^3 of oil (use 3 cm^3) could cover an area of 2000 m^2 . Assuming that the oil on the surface of the water is one molecule thick, estimate the size of an oil molecule. As a historical aside, Franklin never did this calculation and thus never obtained an estimate for the linear dimension of a single molecule. However, similar methods were employed nearly a century later by Lord Kelvin and other scientists to obtain molecule size estimates (French and Taylor, 1978).