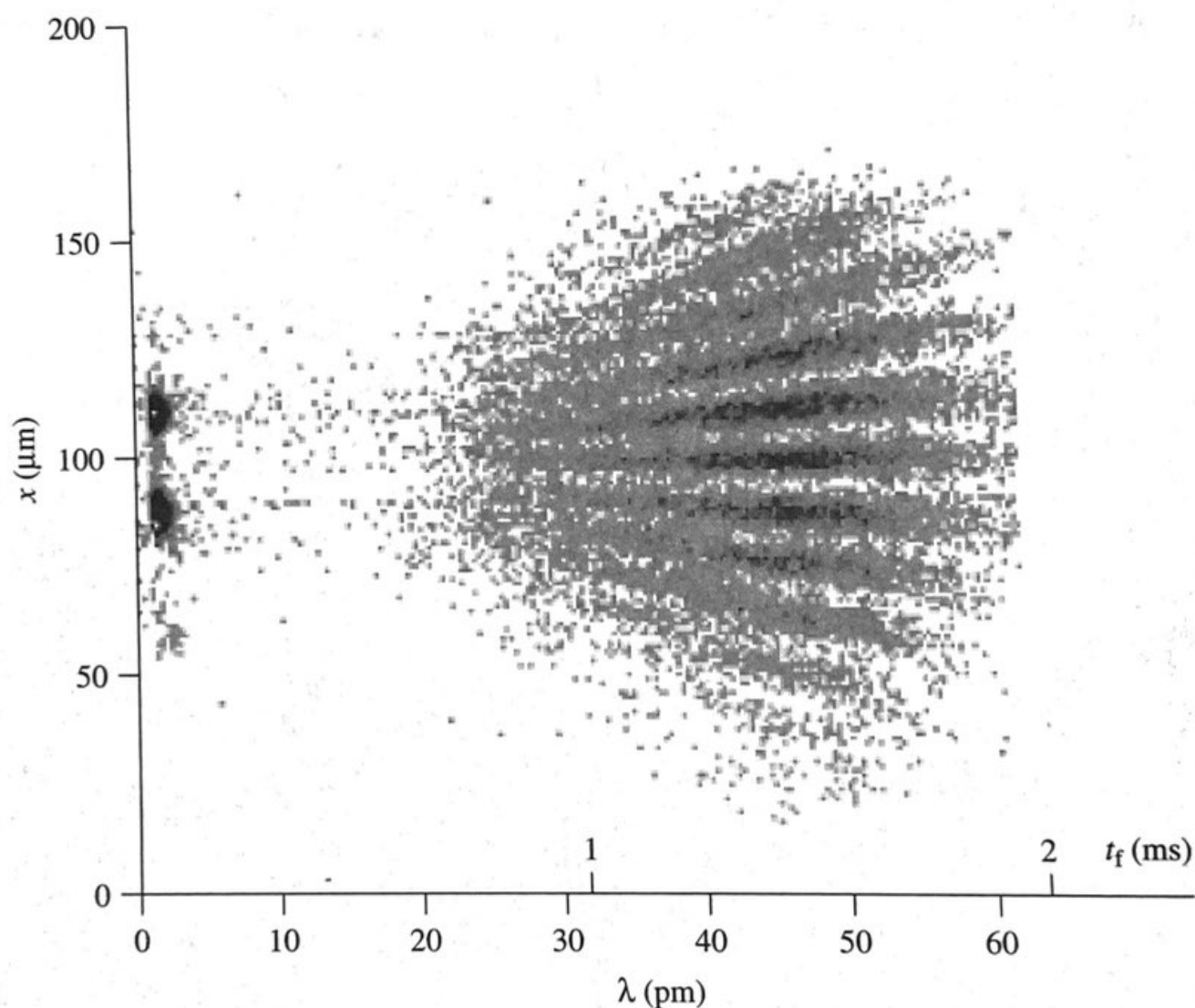
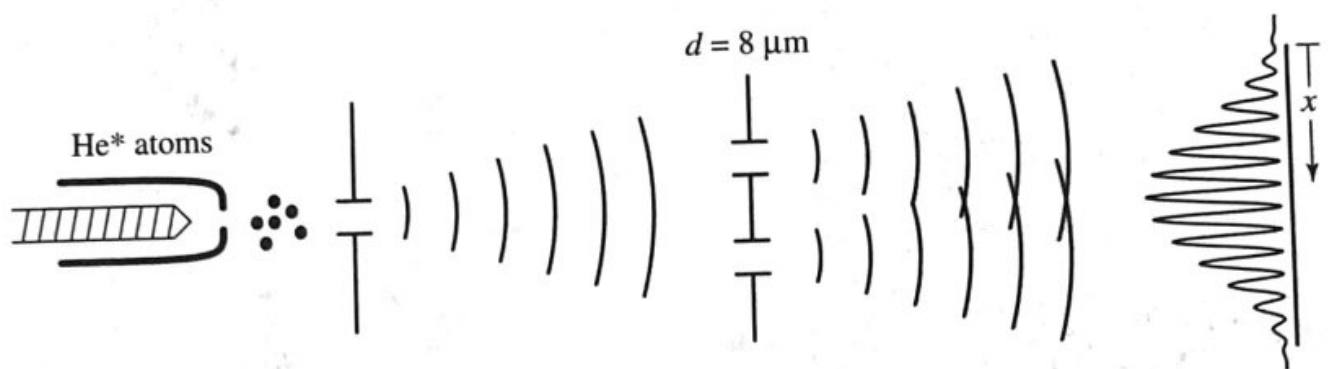




The cover shows the results of a double-slit experiment carried out with individual helium atoms. After passing through the double slit, atoms are incident on an array of detectors arranged transverse to the direction of propagation. The colors on the cover indicate the number of helium atoms detected per pixel, from ten atoms (green), to forty atoms (red), and up to sixty atoms (dark blue). As shown in the graph above, the vertical axis shows the location x of detection and the horizontal axis shows the time of flight t_f of the atoms from a pulsed source to the detector. The time of flight, which is inversely proportional to the velocity of the atoms, is directly proportional to the de Broglie wavelength λ of the atoms. The fast helium atoms have a small de Broglie wavelength and are detected essentially behind the location of the two slits, as would be expected for classical particles, while the slow helium atoms have longer de Broglie wavelengths and exhibit interference maxima and minima that are characteristic of waves. This experiment is discussed in detail in Section 2.1. The data are from Ch. KurtSiefer, T. Pfau, and J. Mlynek.