A beam of electrons is directed through two narrowly spaced slits towards a phosphorescent screen. The electrons create an interference pattern (bright and dark bands) on the screen which demonstrates the wave nature of electrons. Which of the following alteration to this experiment would demonstrate the particle nature of electrons.

1. Fire electrons one at a time, this results in single spots on the screen showing that each electron-screen interaction is localized, hence it’s a particle.

2. Place detectors at the “exit” of both slits to show that the electron do not travel through both slits simultaneously, and hence it is not a wave but a particle.

3. de Broglie’s wavelength of the electron tells us the length scale we must look to see the wave nature of the electron, therefore if the slit widths are increased then we’ll observe the particle nature of the electron.