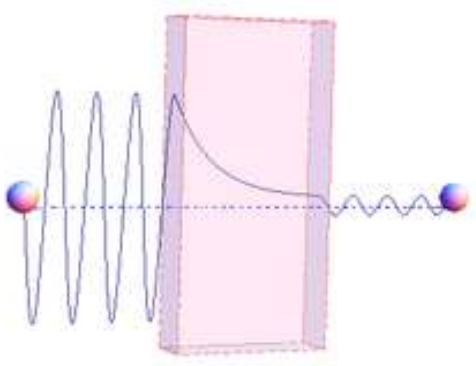
Tunnelling, potential barrier and factors affecting tunnelling probability

Quantum tunnelling refers to a phenomenon where a sub-atomic particle is able to phase through a barrier and move to the other side, if the energy barrier is thin enough, due to **quantum** mechanics being dependent on probability.



- The position of a particle is described as a wave function (see previous section).
- From the graph above, the observable particle is most likely to be at the position where its wave function has the largest amplitude. However, although the amplitude of the wave function will decay exponentially, since the wave function does not reach an amplitude of zero, the wave function can exit the barrier. Once the wave function exits the barrier, its amplitude no longer decays. This means that a particle has a certain probability of bouncing off a barrier and a certain probability of passing through the other side.

Factor	Effect towards tunnelling probability
Increase barrier length	Decrease
Increase particle mass	Decrease

This explains how tunnelling is frequent in nanoscale but negligible at the macroscopic level.