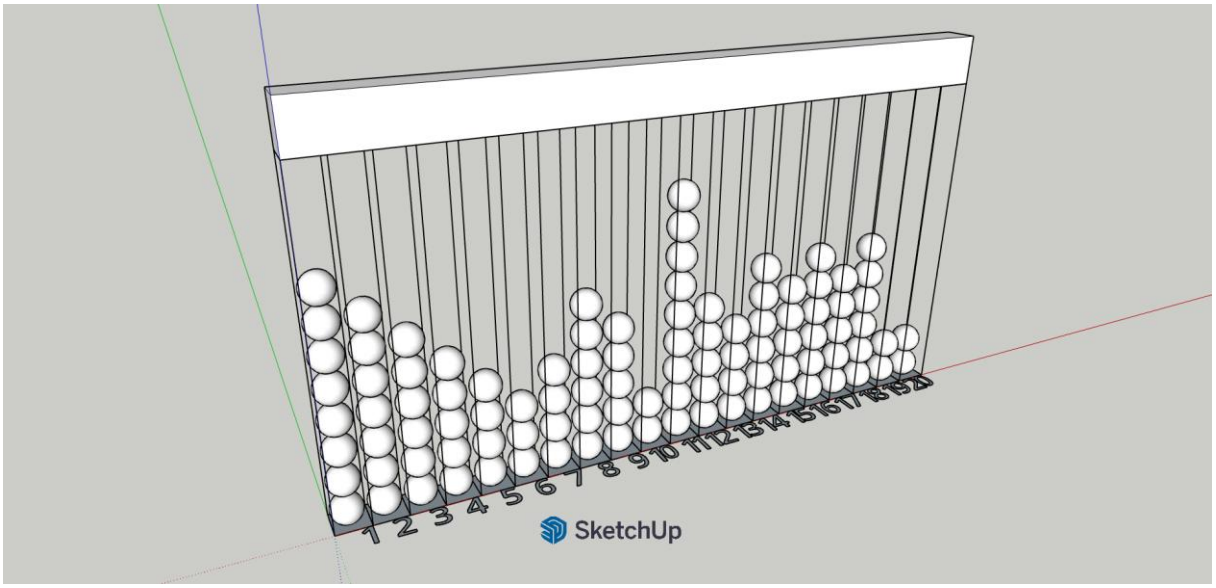
This paper deals with the probability density for a free particle on basis of pictures.

Hope I can help you with learning quantum mechanics.

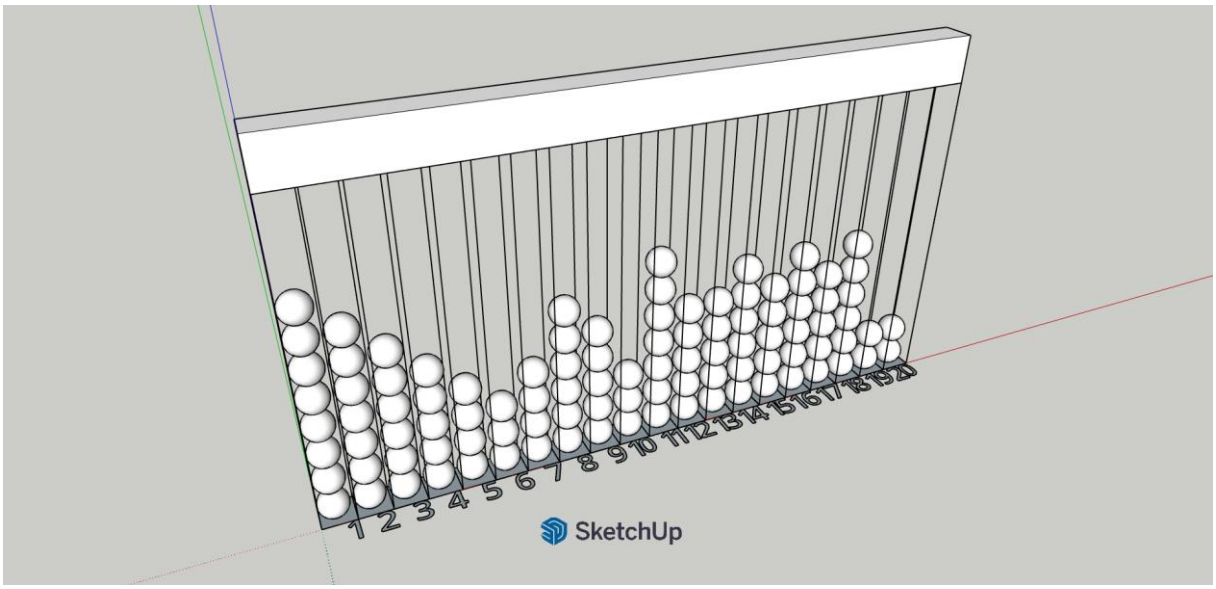
The following picture shows a discrete probability density. Each sphere represents an amount of 1% of probability. The cage is constructed in a way that the spheres can change the columns but not leave the cage at all.

This picture fulfills some properties of wave functions:

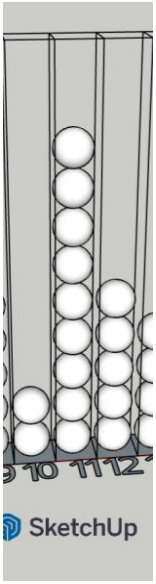
- The sum over all probabilities in the columns always add to one
- The probability of finding the particle at one of the twenty possible positions corresponds to the number of spheres located at this position
- Shaking the cage may change the probabilities of each position

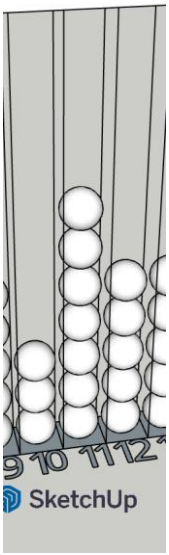


We shake it. Afterwards we get the following probability distribution:



Let us take a closer look at positions 10 to 12.





The probability of finding the particle within positions 10 to 12 was 16%.

The probability of finding the particle within positions 10 to 12 now is 15%

As no sphere can disappear the only explanation is that the net change of spheres within region 10 to 12 is one. We do not know whether 3 spheres came in and 4 spheres left off or any changes that sum up to one.

This is the probability flow connected to the change of probabilities:

$$\frac{\partial}{\partial t}\rho(\vec{x},t) = -\nabla \cdot j(\vec{x},t)$$

The change of probability density in time corresponds to a probability flow in space.