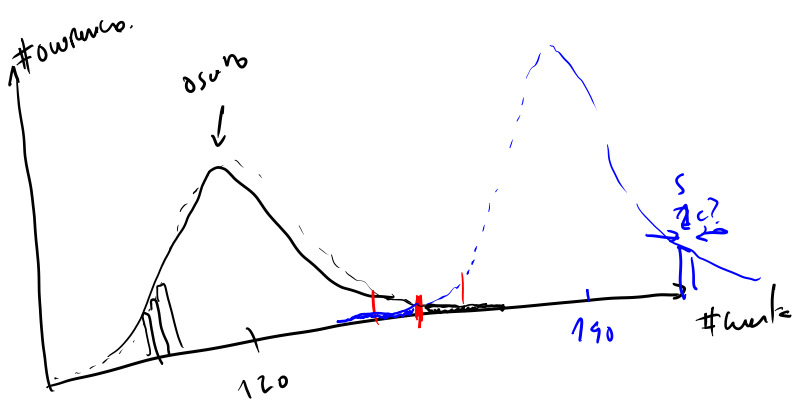
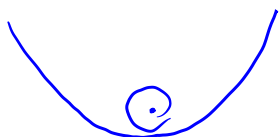


Notas Robi 18.11.2020
 (14) fig 1 "osun"
 con fig 2 "brillab"



Poisson! \leftarrow es brinca

Atmos de Rydberg
 in condens



$|n\rangle \otimes |e/g\rangle$

fotons
 en la cavida

\uparrow
 estado
 2 niveles

$|n\rangle \otimes |e/g\rangle$

\uparrow
 posición
 del CM del
 ion
 - oscilador
 armónico

\uparrow
 estado
 2 niveles

$$H_{int} = \frac{1}{2} \hbar \omega (a + a^\dagger) \otimes |n\rangle$$

$$= e^{i k x}$$

$$= e^{i \hbar \omega (a + a^\dagger) (a + a^\dagger)} = e^{-i \hbar \omega (a + a^\dagger)}$$

$$\approx 1 - i \hbar \omega (a + a^\dagger)$$

Hint

$$\begin{aligned}
 \hat{E} \cdot \hat{d} &= e^{ikx} \cdot \hat{d} = e^{ikx_{cm}} \underbrace{e^{ikx_{rd.}}}_{1} \cdot \hat{d} \\
 &= \underbrace{(1 - i\hbar(a + a^\dagger))}_{\hat{d}} (\hat{c}^+ + \hat{c}^-) \\
 &= 1(\hat{c}^+ + \hat{c}^-) + i\hbar(a + a^\dagger)(\hat{c}^+ + \hat{c}^-)
 \end{aligned}$$