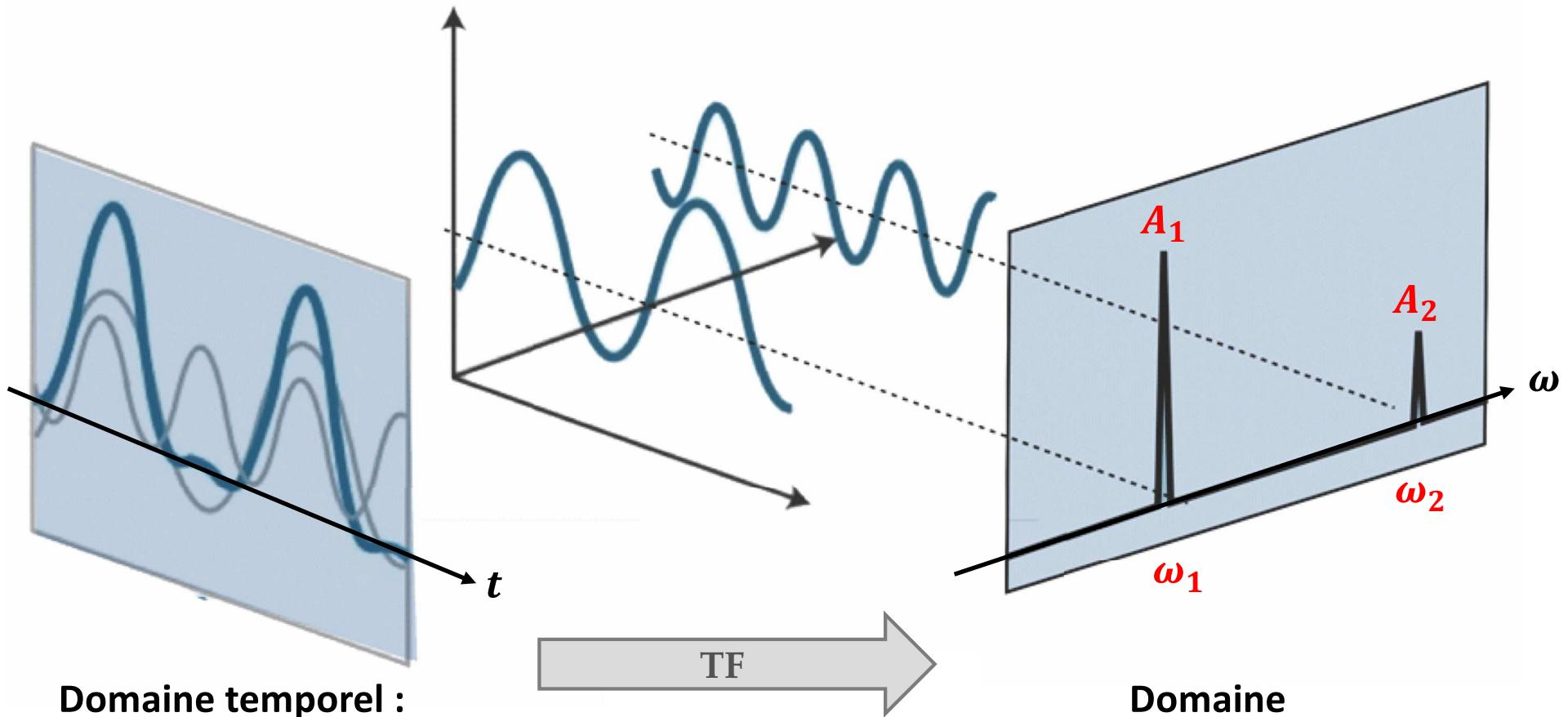


# Formation de l'image



Transformée de Fourier (TF)  $FID(t) = M_L(1 - e^{-t_r/T_1}) \sin(\eta) e^{-t_e/T_2} \sin(\omega_0 t)$



Domaine temporel :

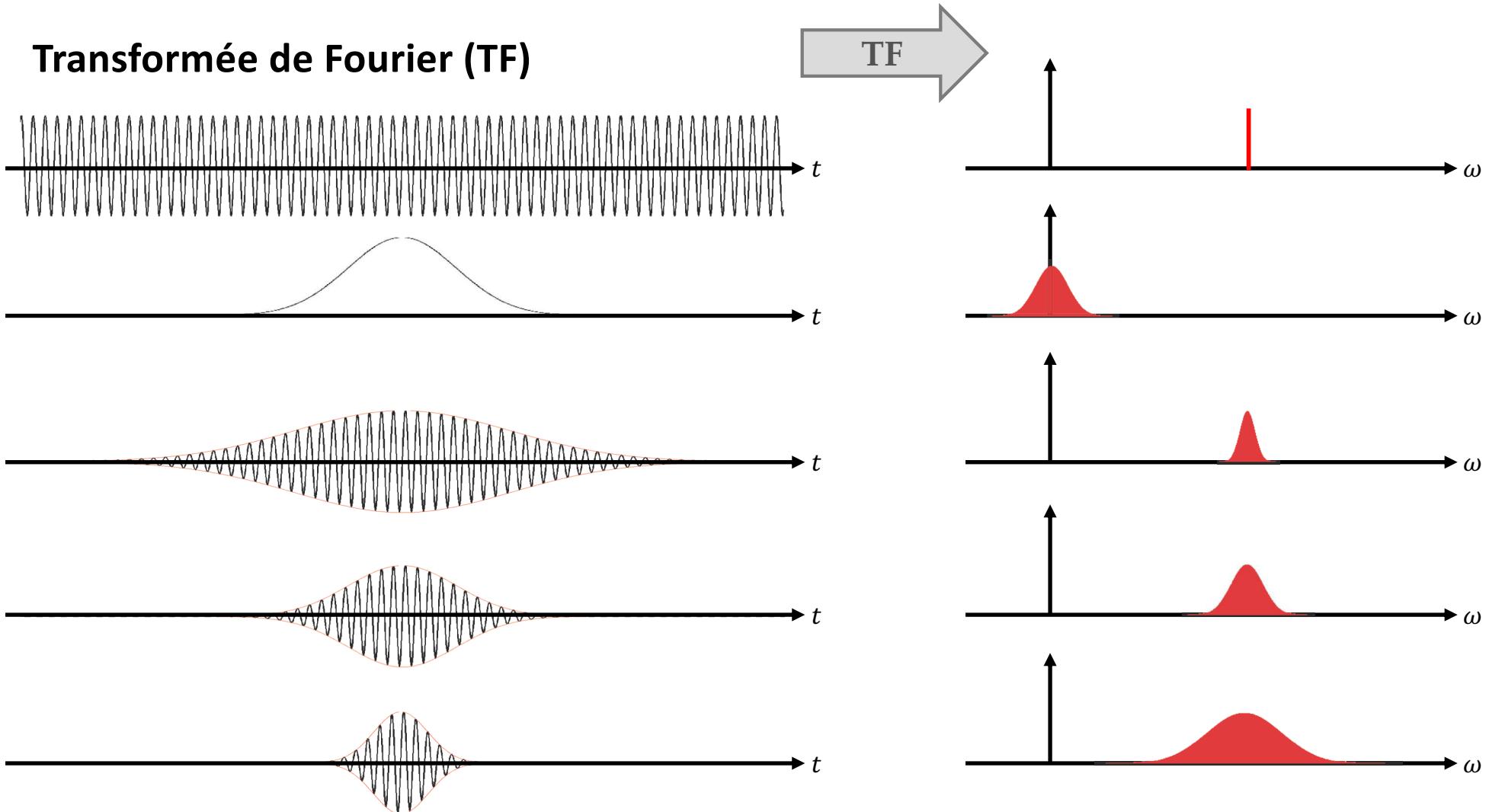
$$f(t) = \sum A_i \sin(\omega_i t)$$

Domaine  
fréquentiel :  $F(\omega)$

# Formation de l'image



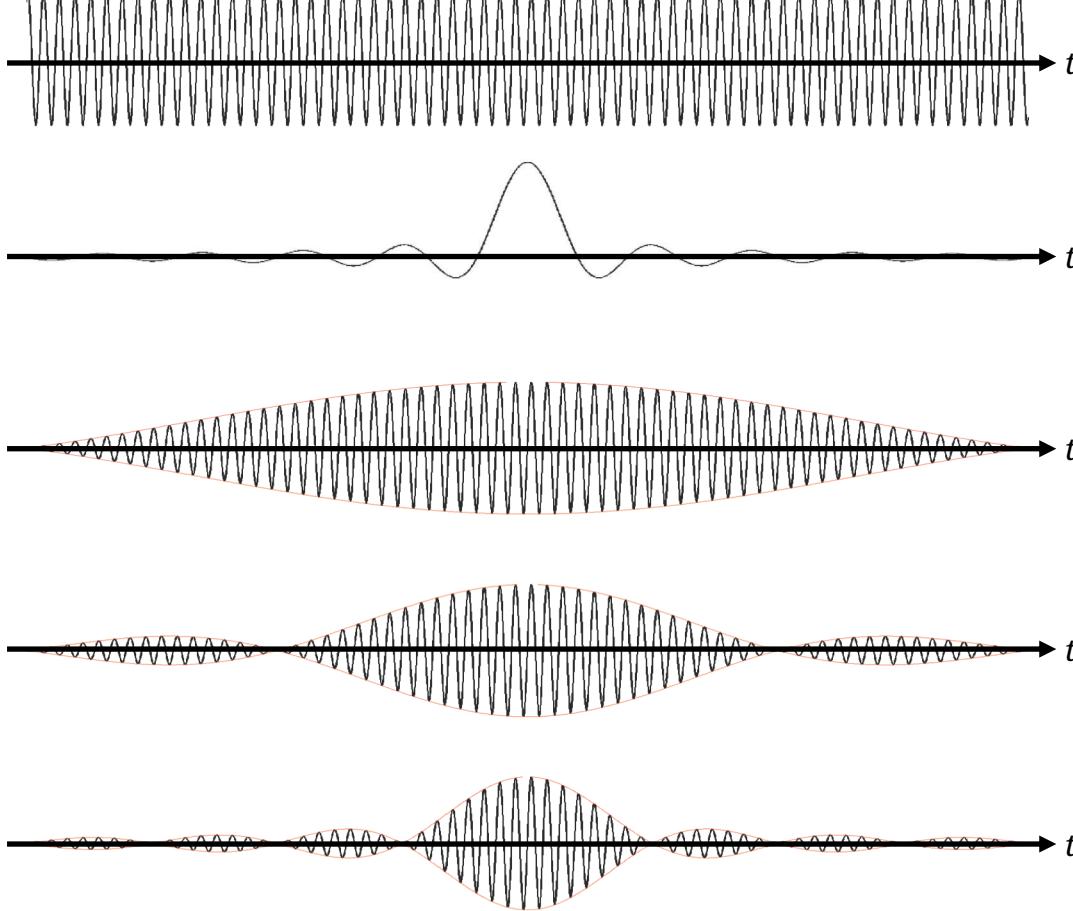
## Transformée de Fourier (TF)



# Formation de l'image



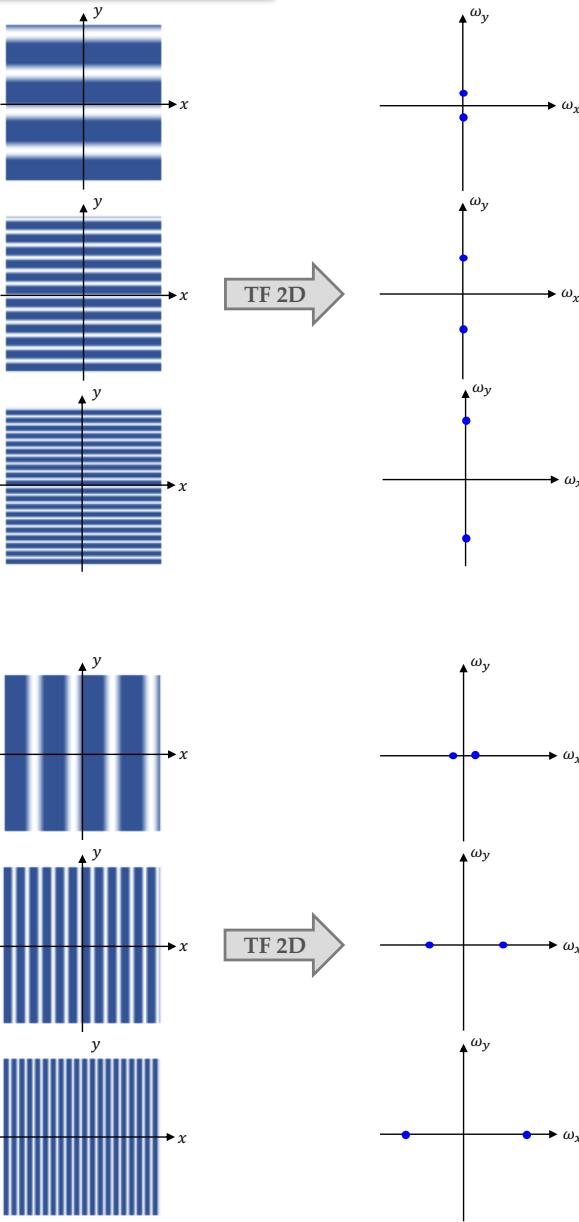
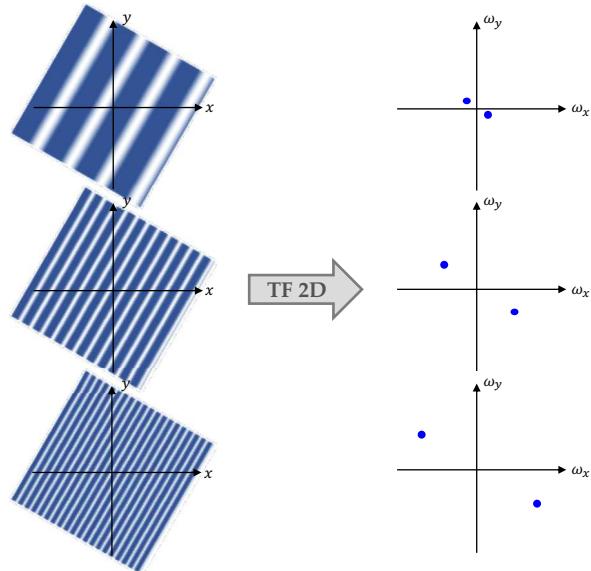
## Transformée de Fourier (TF)



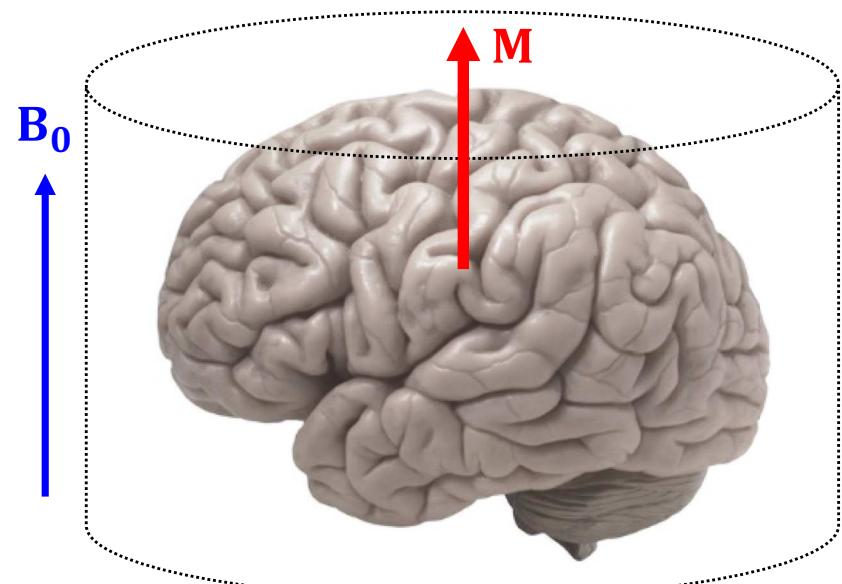
# Formation de l'image



## Transformée de Fourier (TF)



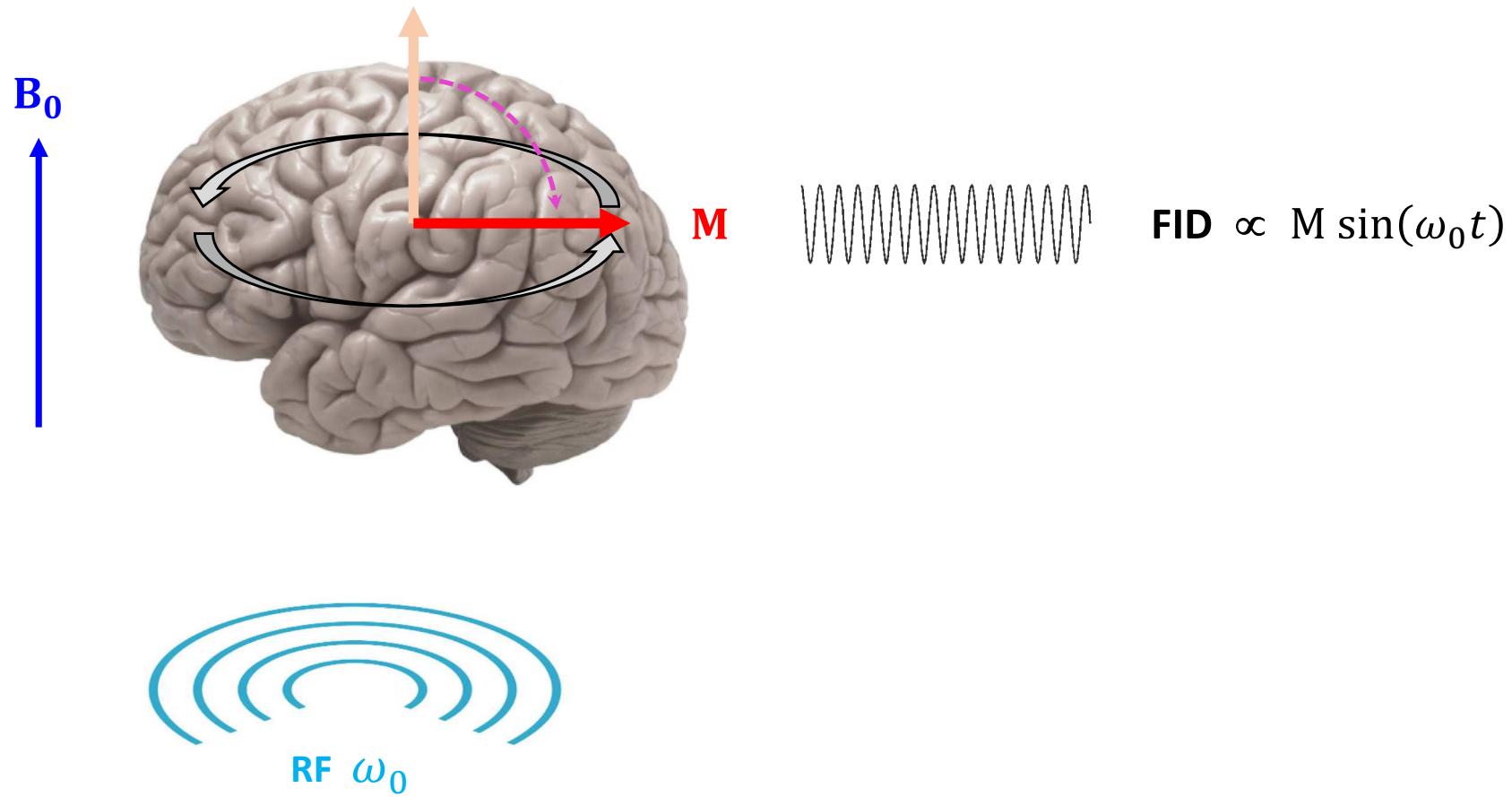
# Formation de l'image



# Formation de l'image



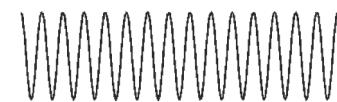
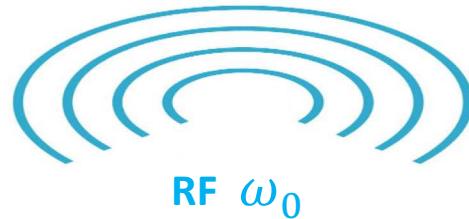
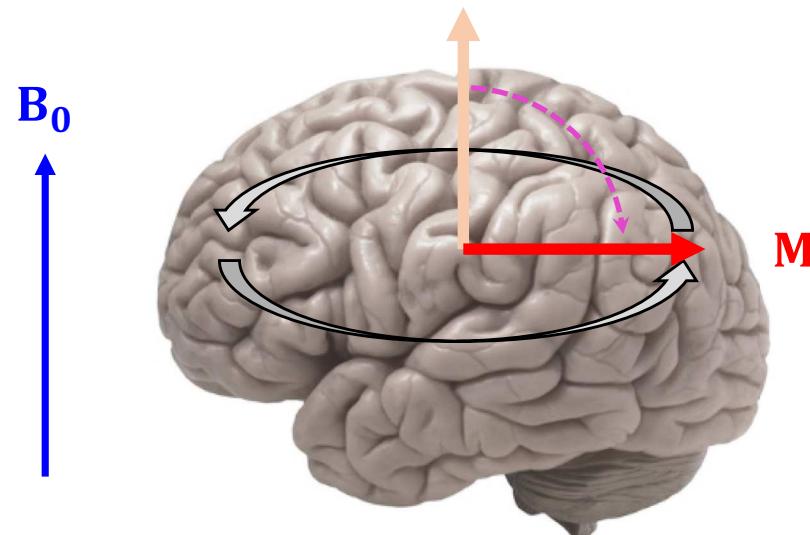
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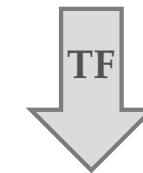
# Formation de l'image



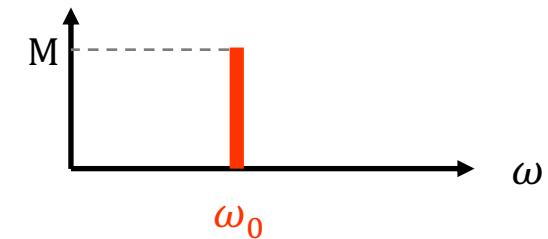
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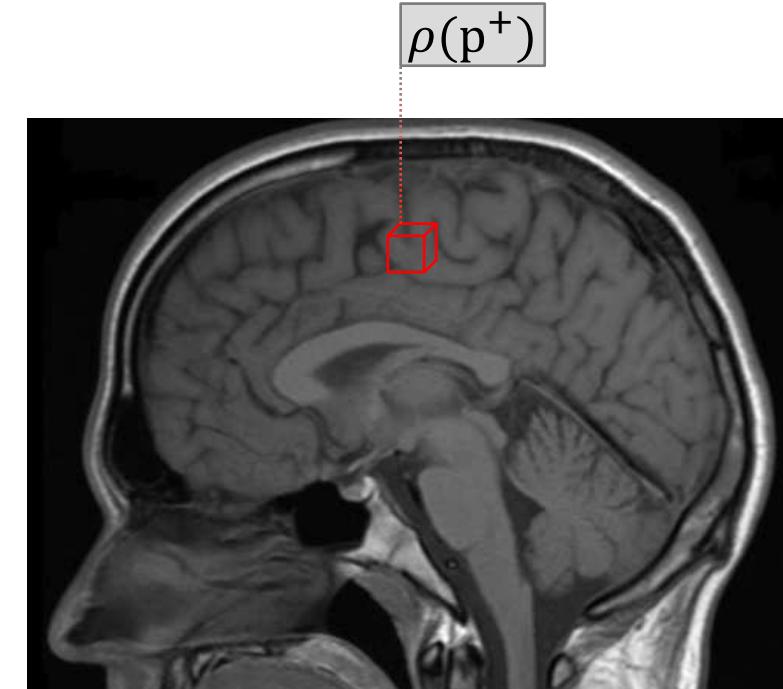
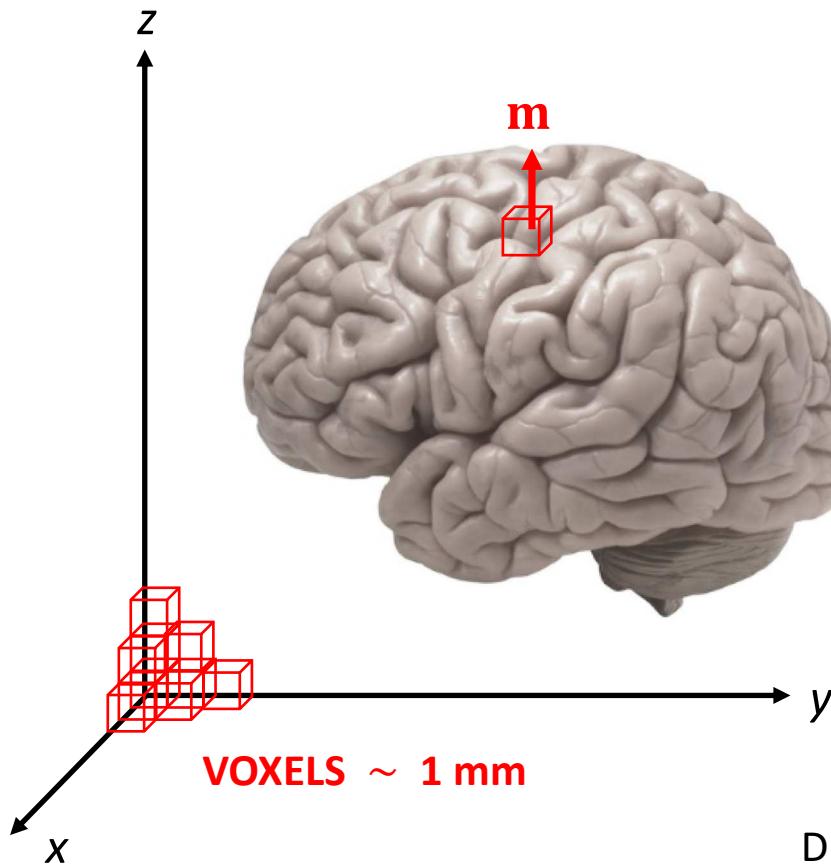
$$\text{FID} \propto M \sin(\omega_0 t)$$



Spectre (FID)

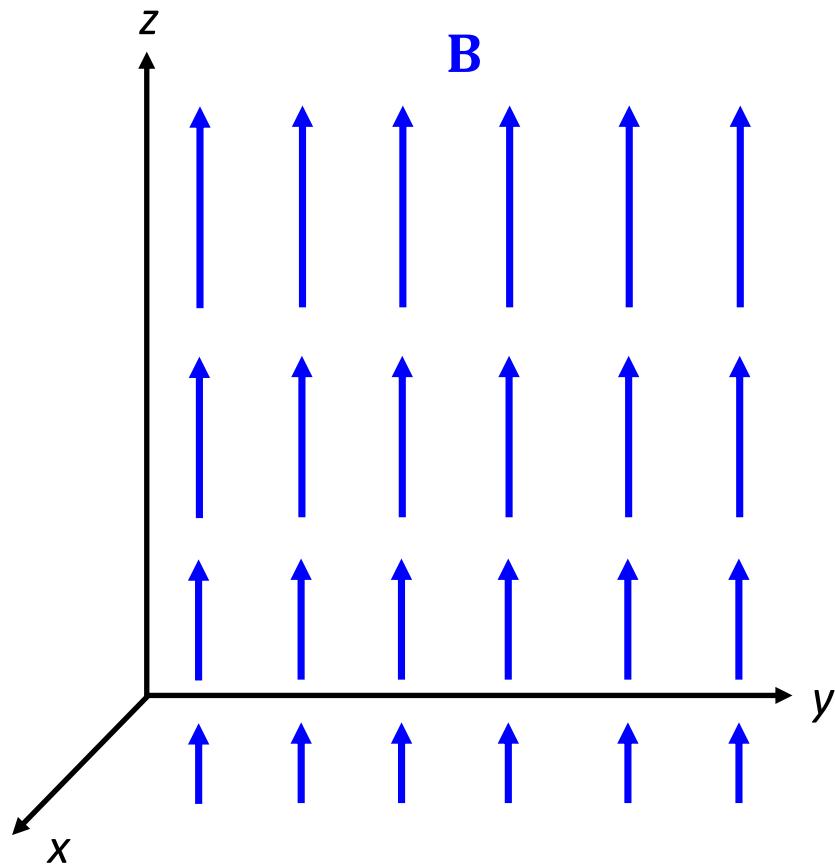


# Formation de l'image

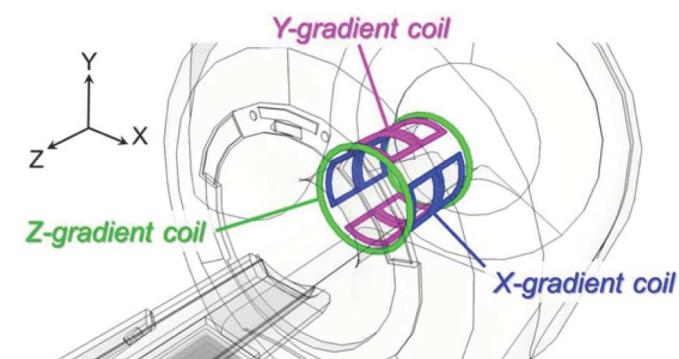


Dimension du volume dont on veut obtenir des images =  
champ de vue (FOV)

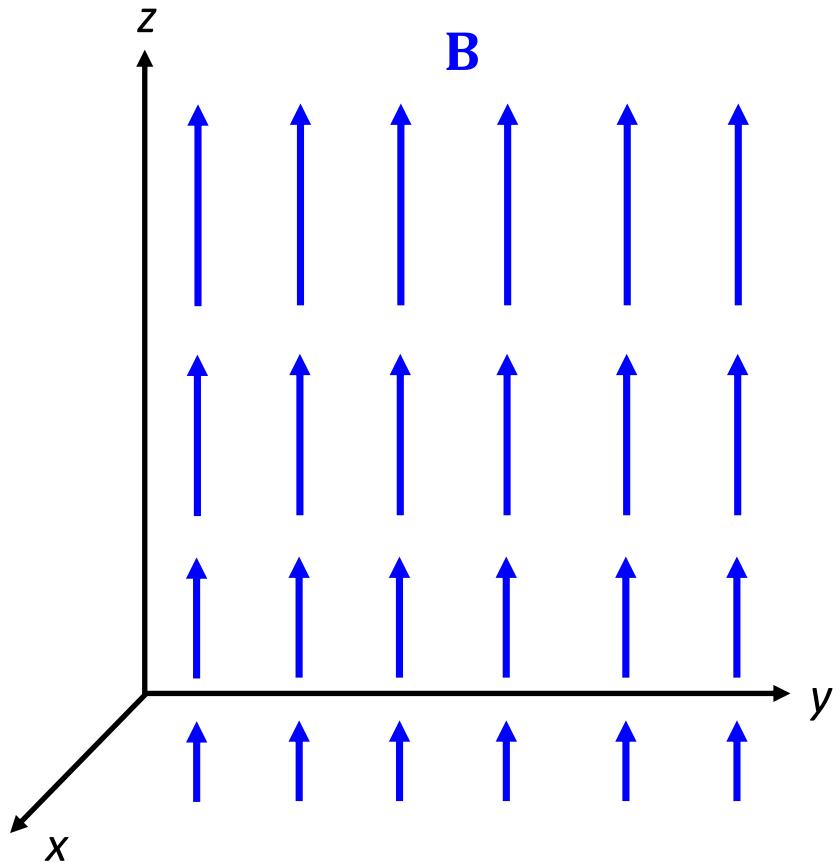
# Formation de l'image



B variable (*gradients d'encodage, de lecture, de phase*)

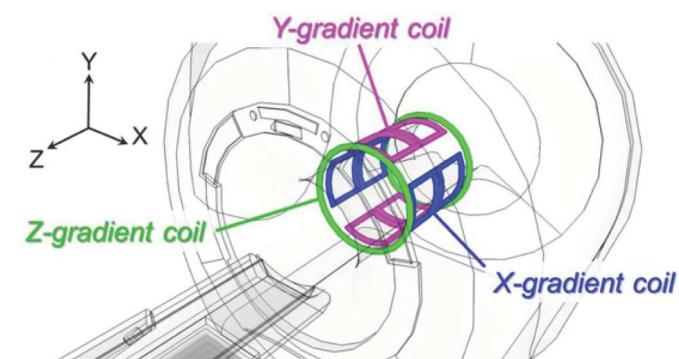


# Formation de l'image

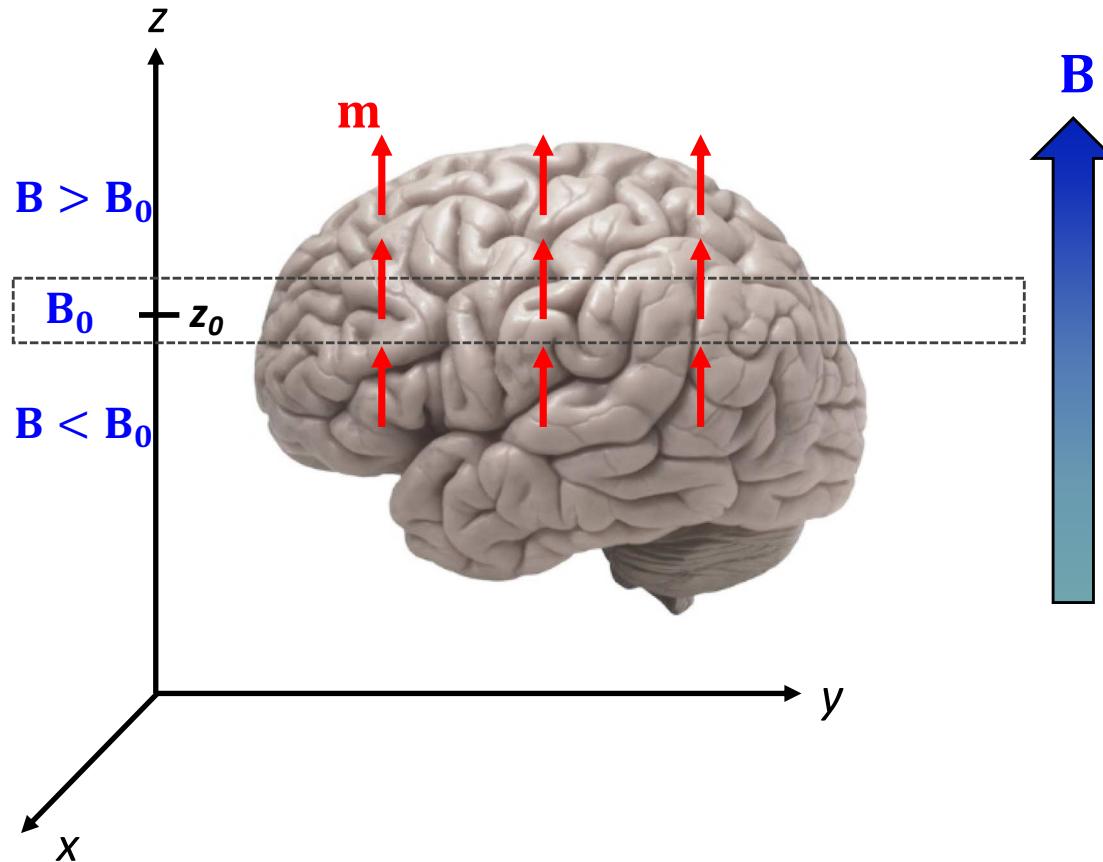


**B** variable (*gradient d'encodage = gradient de sélection de coupe*)

$$G_E = \frac{dB}{dz}$$



# Formation de l'image



$B$  variable (*gradient d'encodage = gradient de sélection de coupe*)

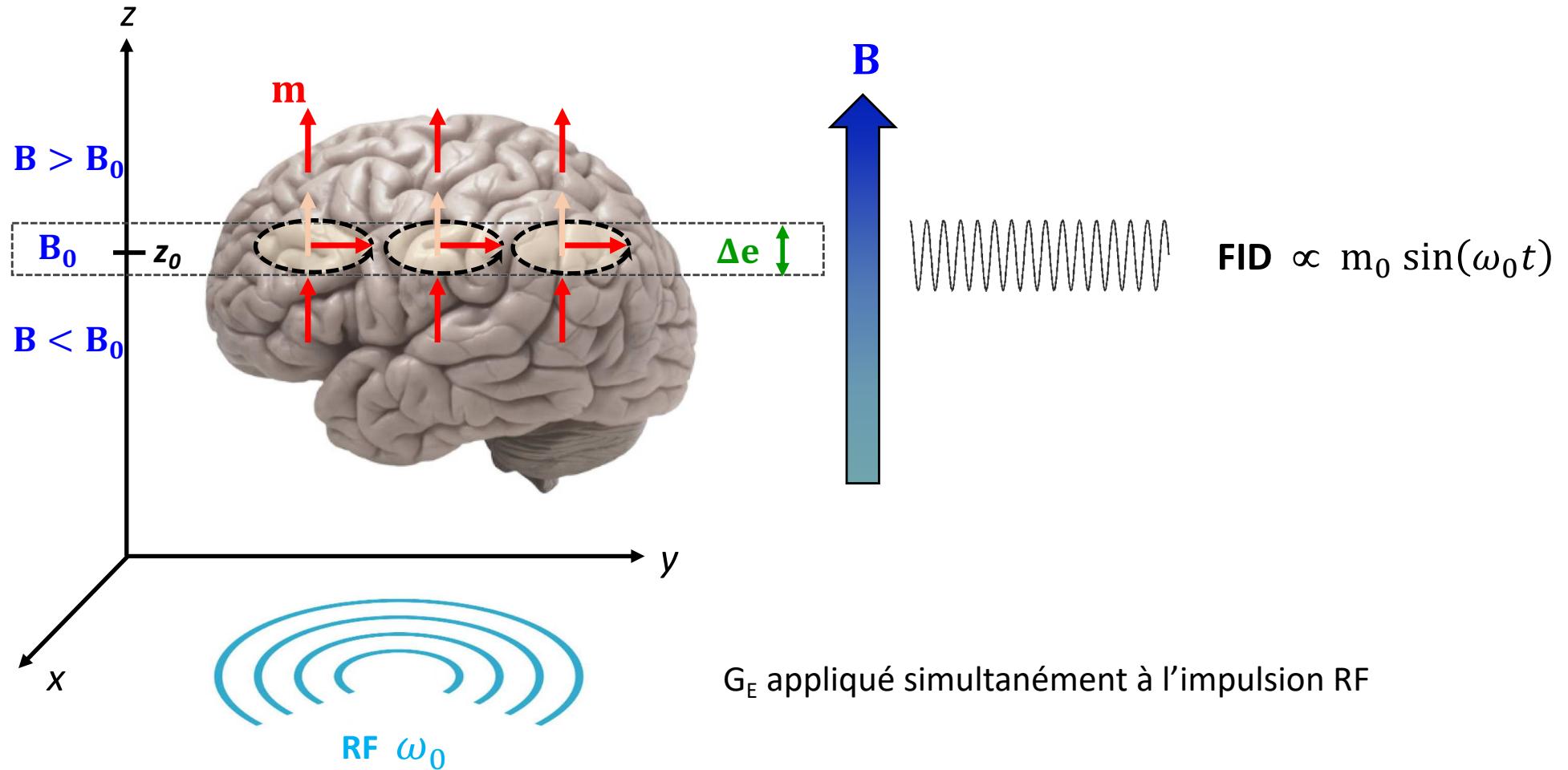
$$B = B_0 + G_E (z - z_0)$$

$$G_E = \frac{dB}{dz}$$

# Formation de l'image



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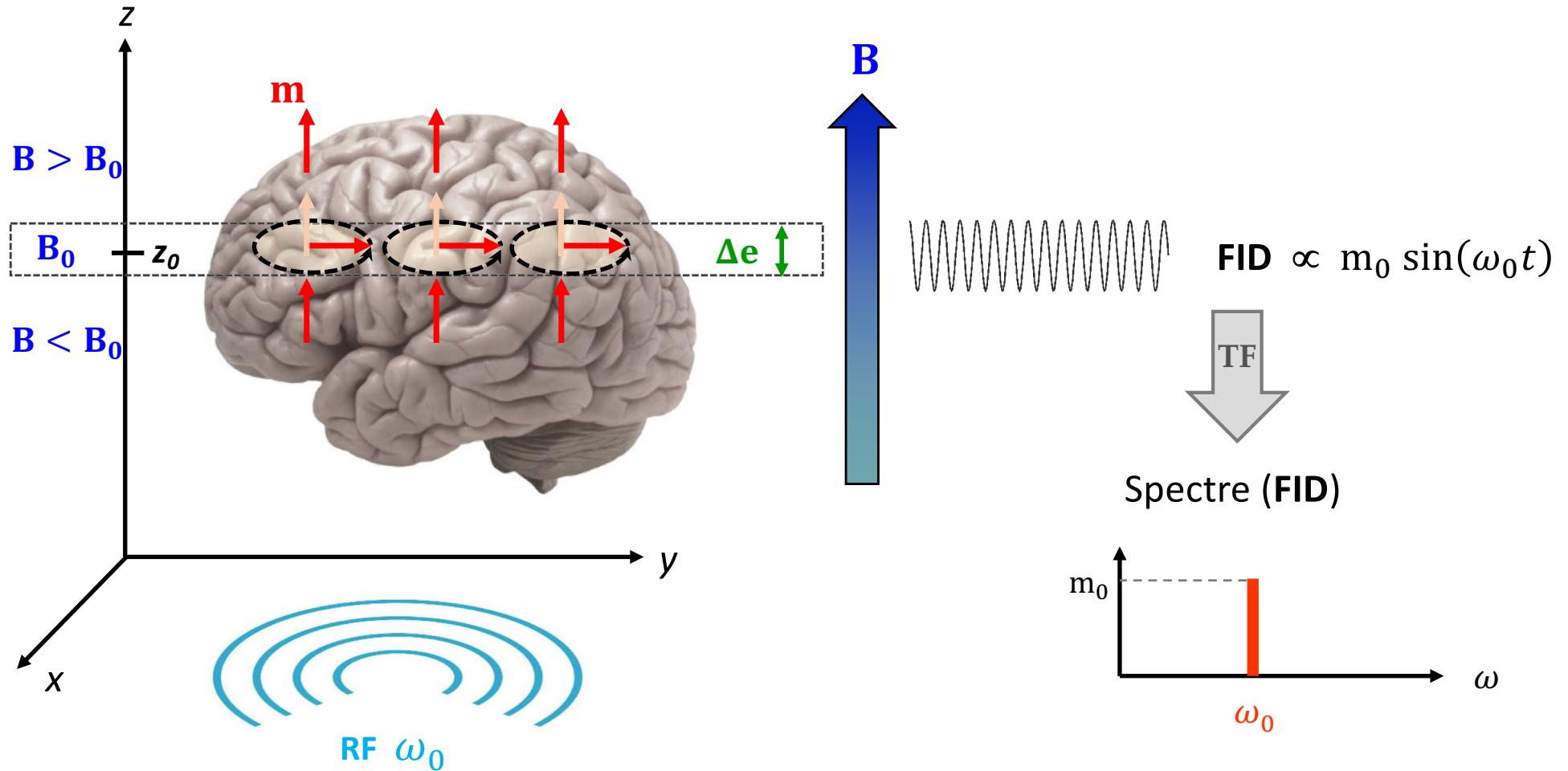


$G_E$  appliqué simultanément à l'impulsion RF

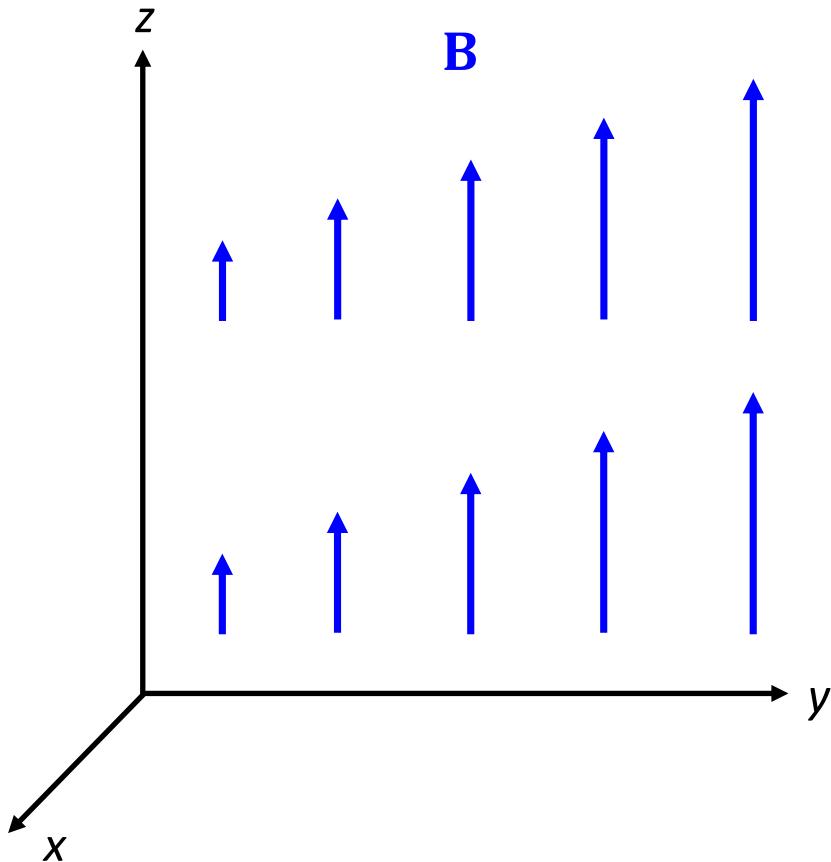
# Formation de l'image



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# Formation de l'image

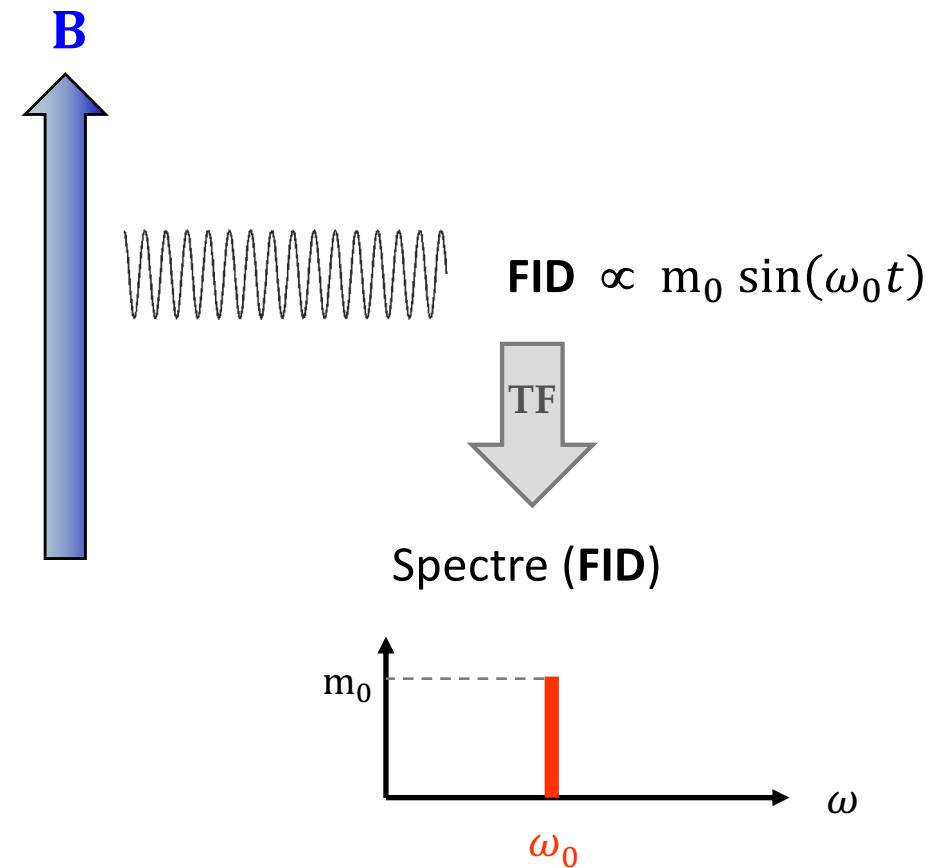
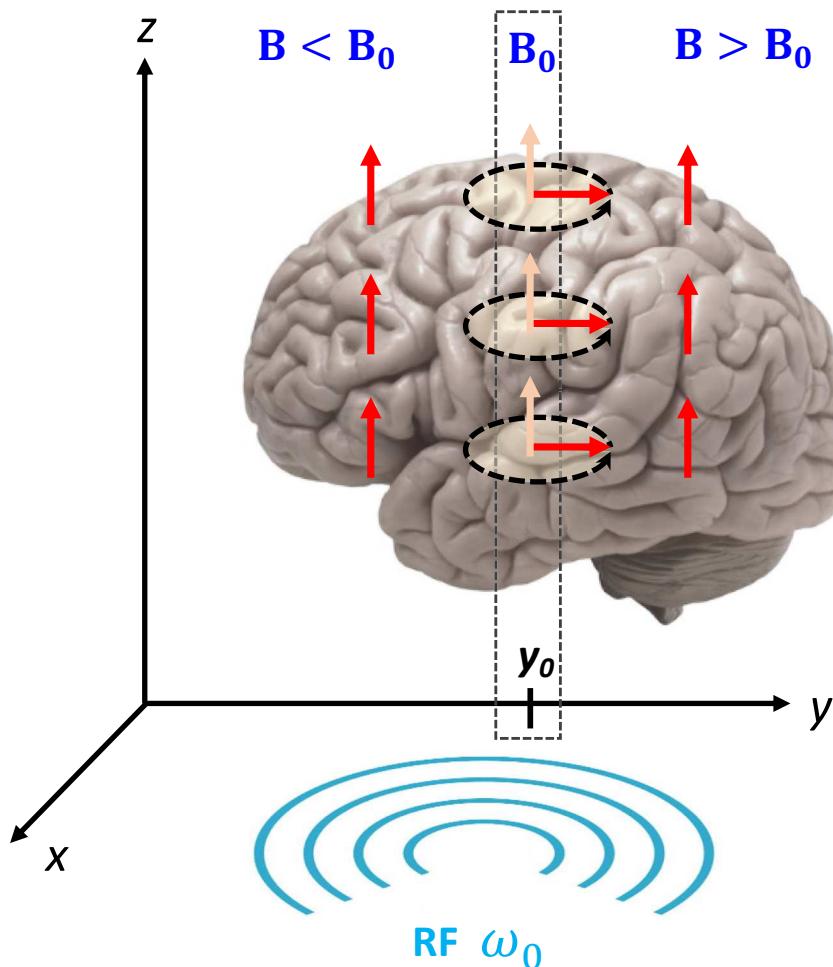


**B** variable (*gradient d'encodage*)

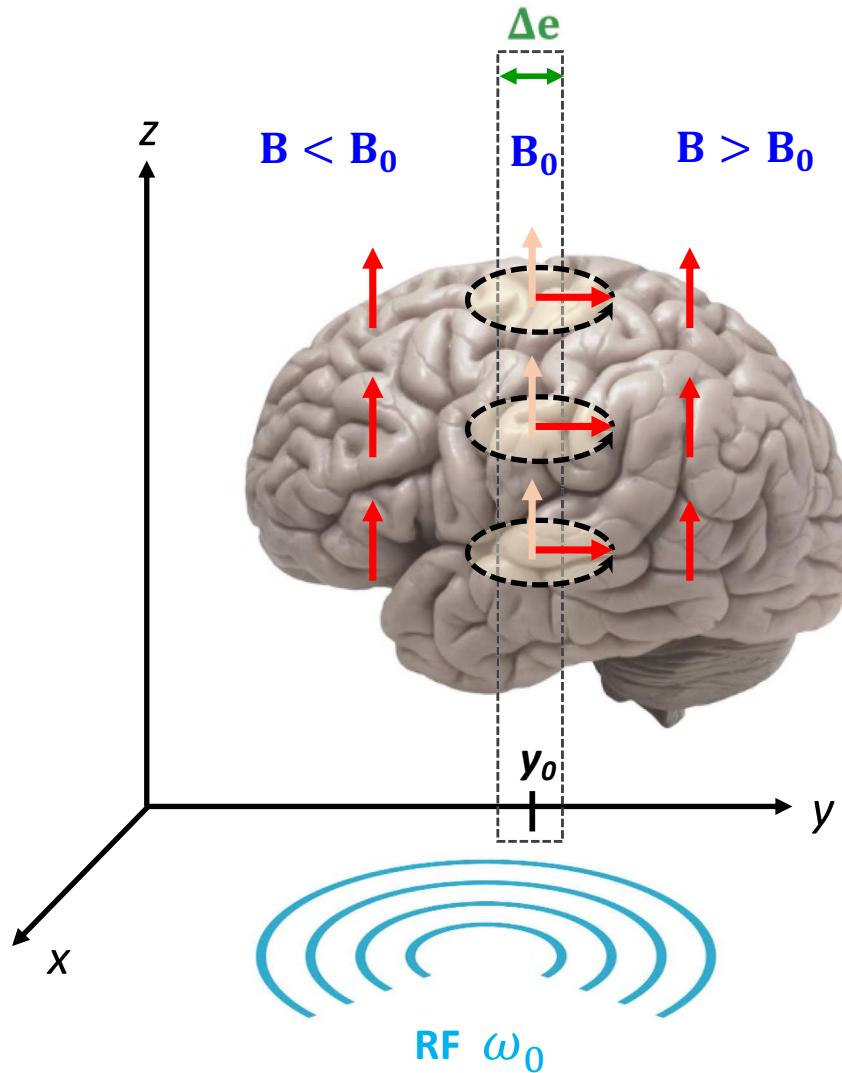
$$\mathbf{B} = \mathbf{B}_0 + \mathbf{G}_E (y - y_0)$$

$$\mathbf{G}_E = \frac{d\mathbf{B}}{dy}$$

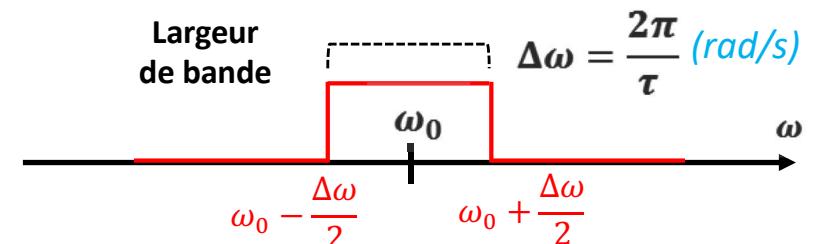
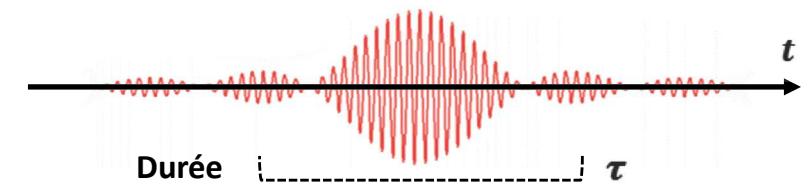
# Formation de l'image



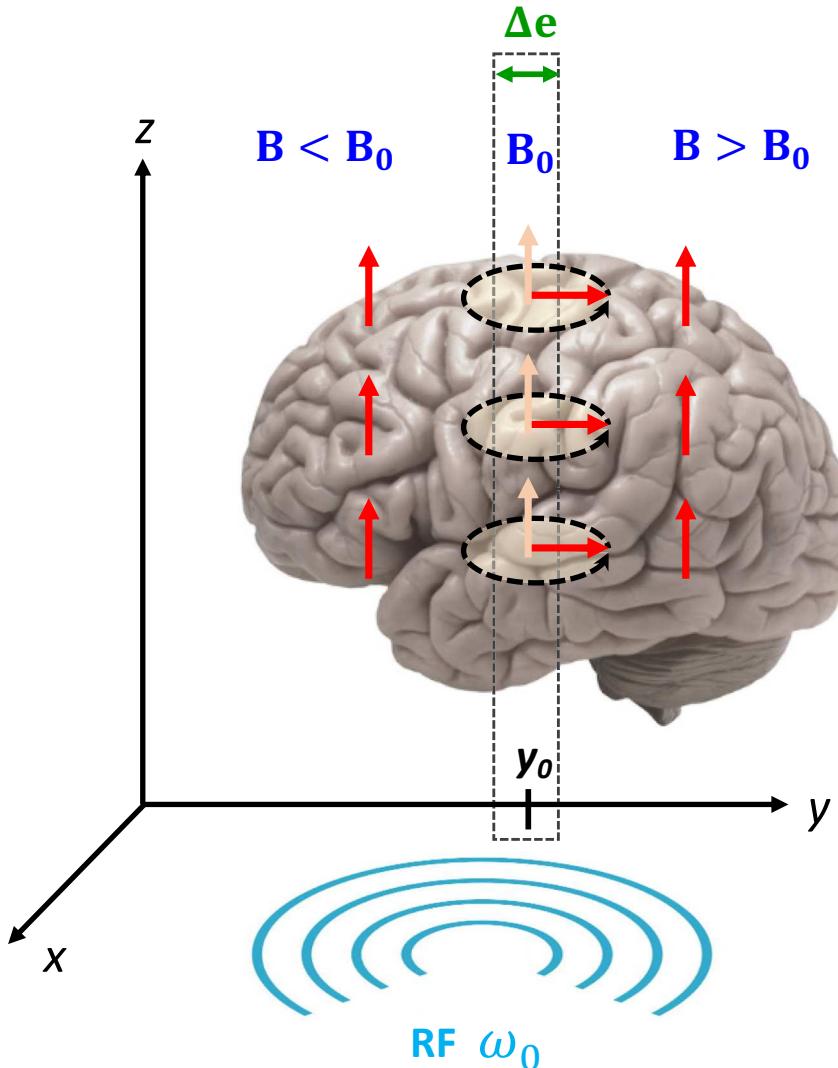
# Formation de l'image



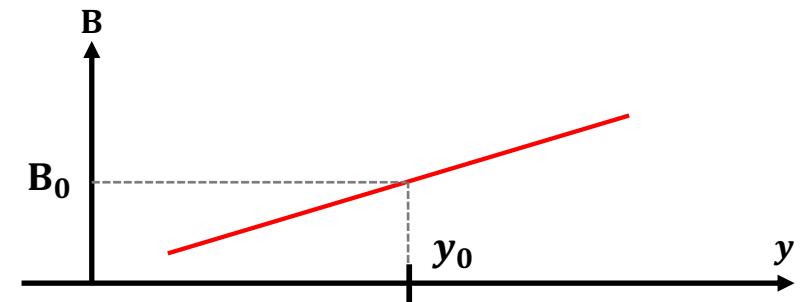
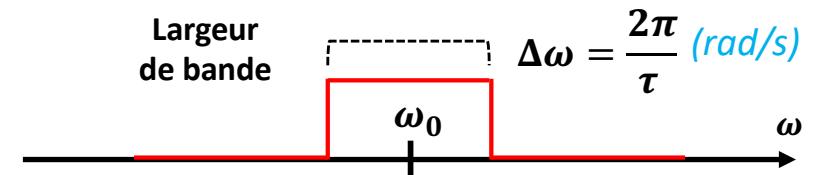
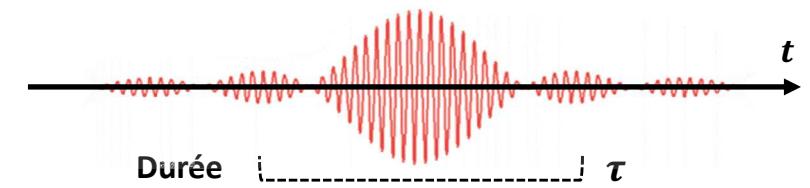
## Impulsion radiofréquence



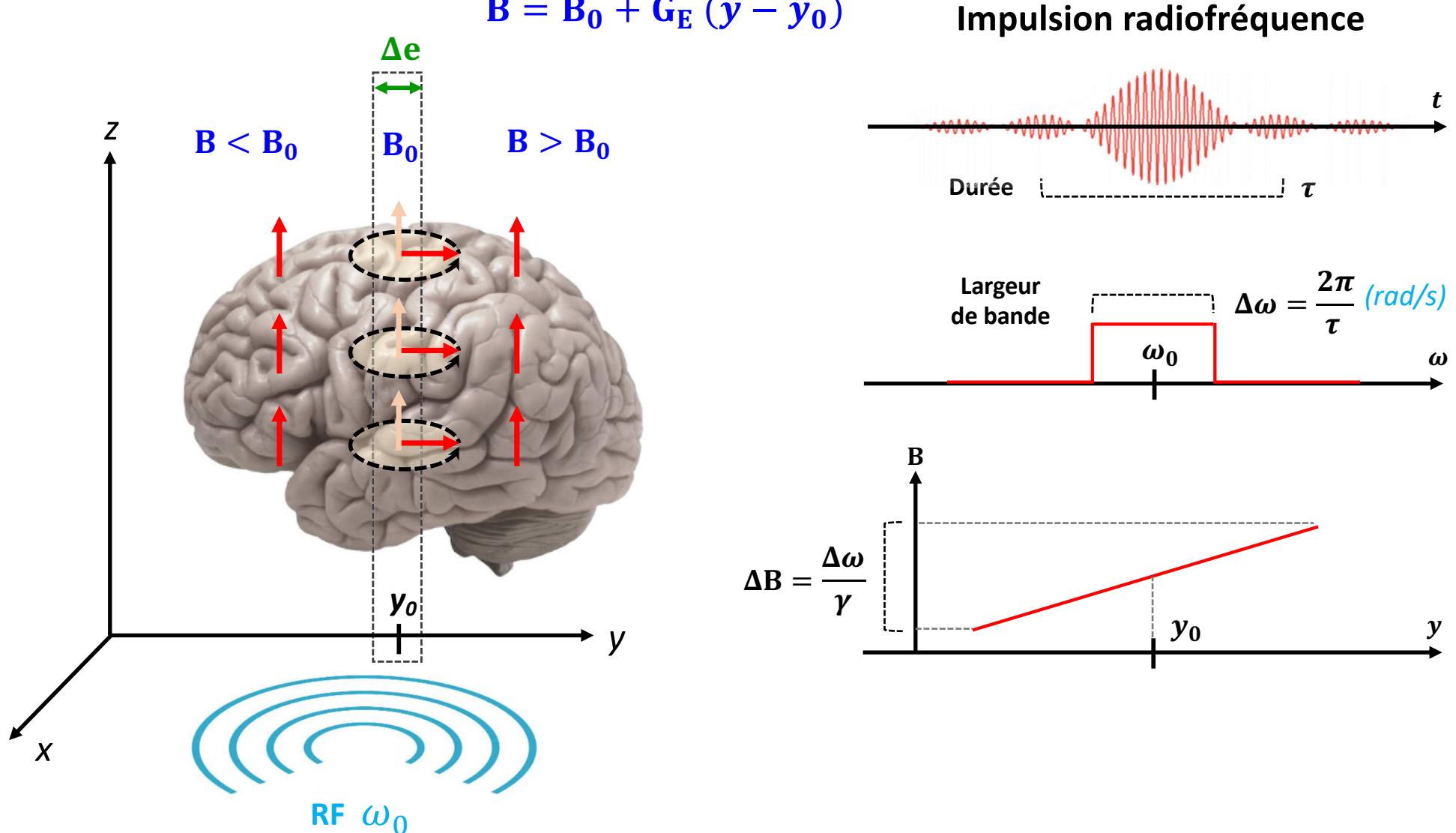
# Formation de l'image



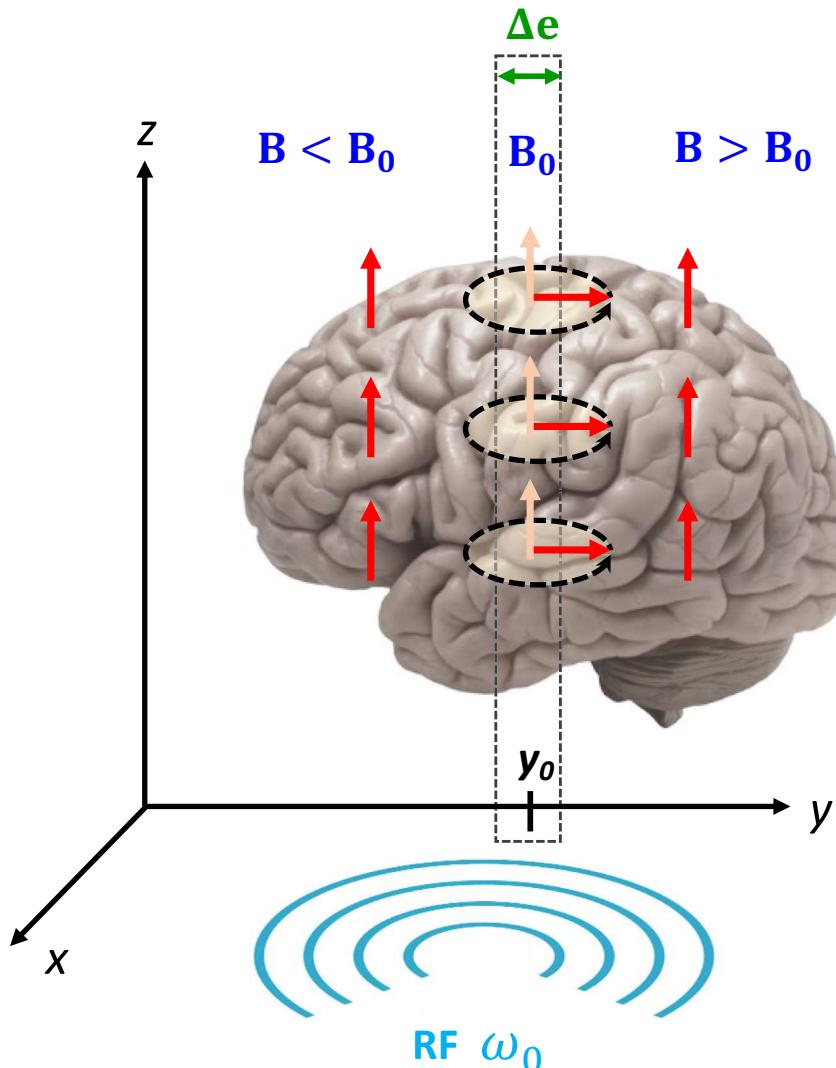
## Impulsion radiofréquence



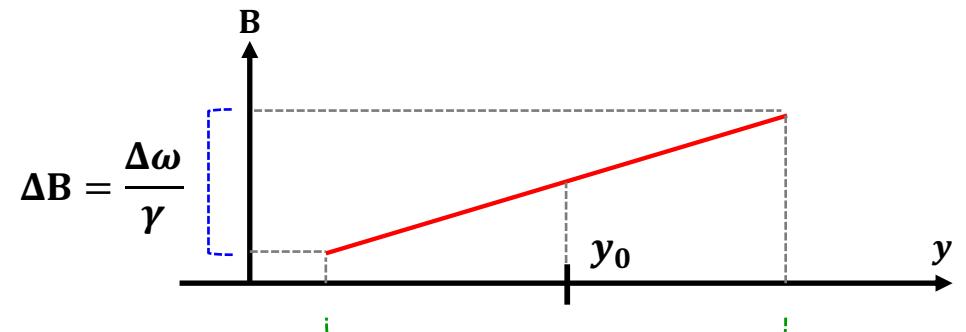
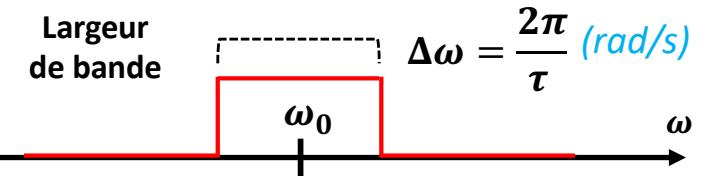
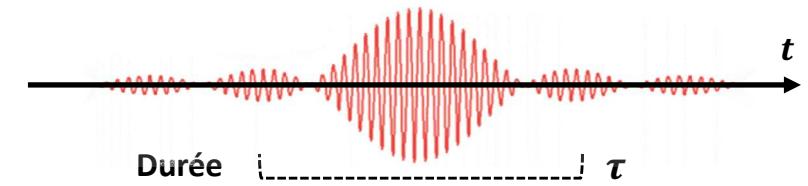
# Formation de l'image



# Formation de l'image



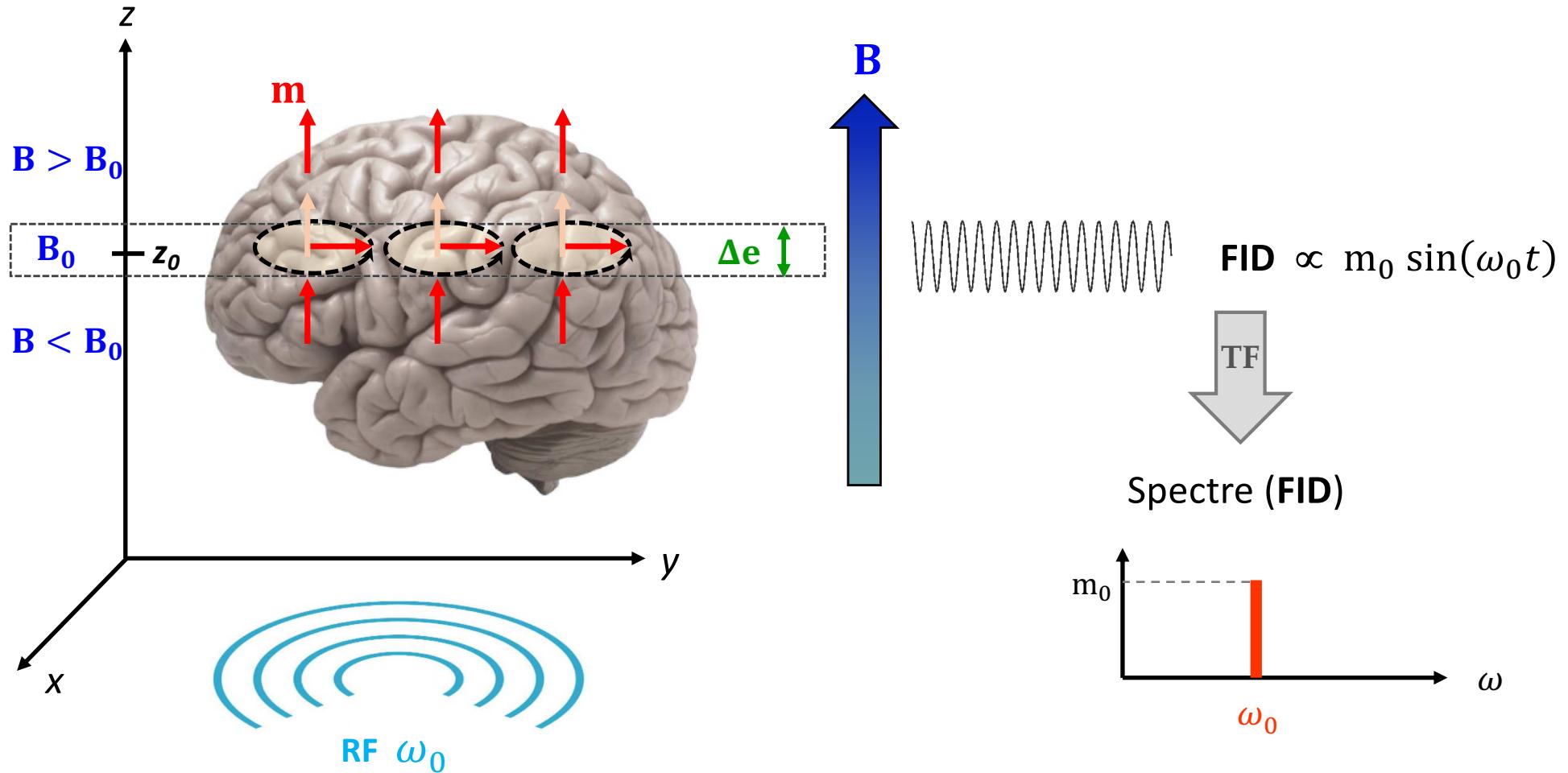
Impulsion radiofréquence



Epaisseur de coupe

$$\Delta y = \Delta e = \frac{\Delta B}{G_E} = \frac{2\pi}{\tau \gamma G_E}$$

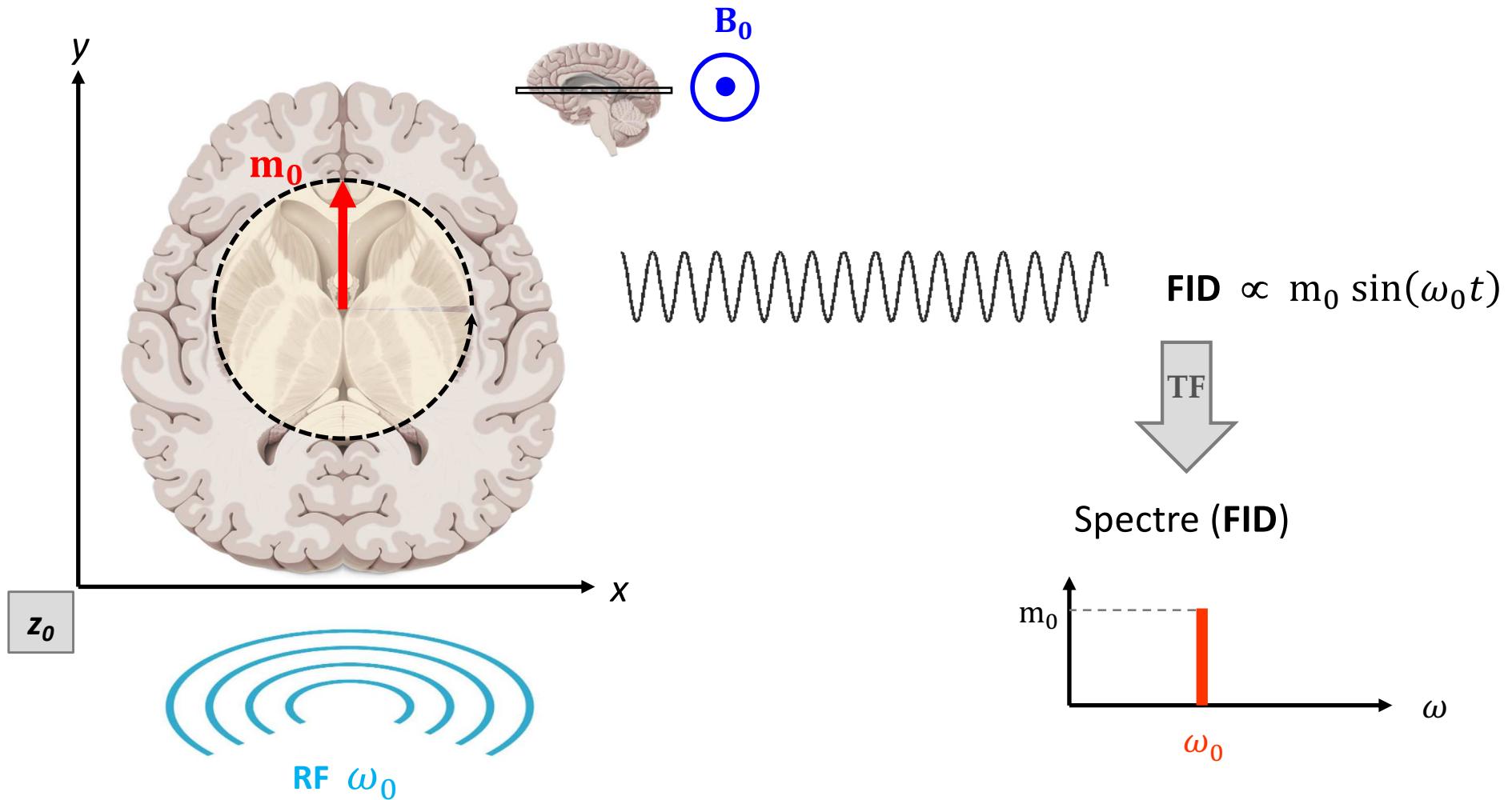
# Formation de l'image



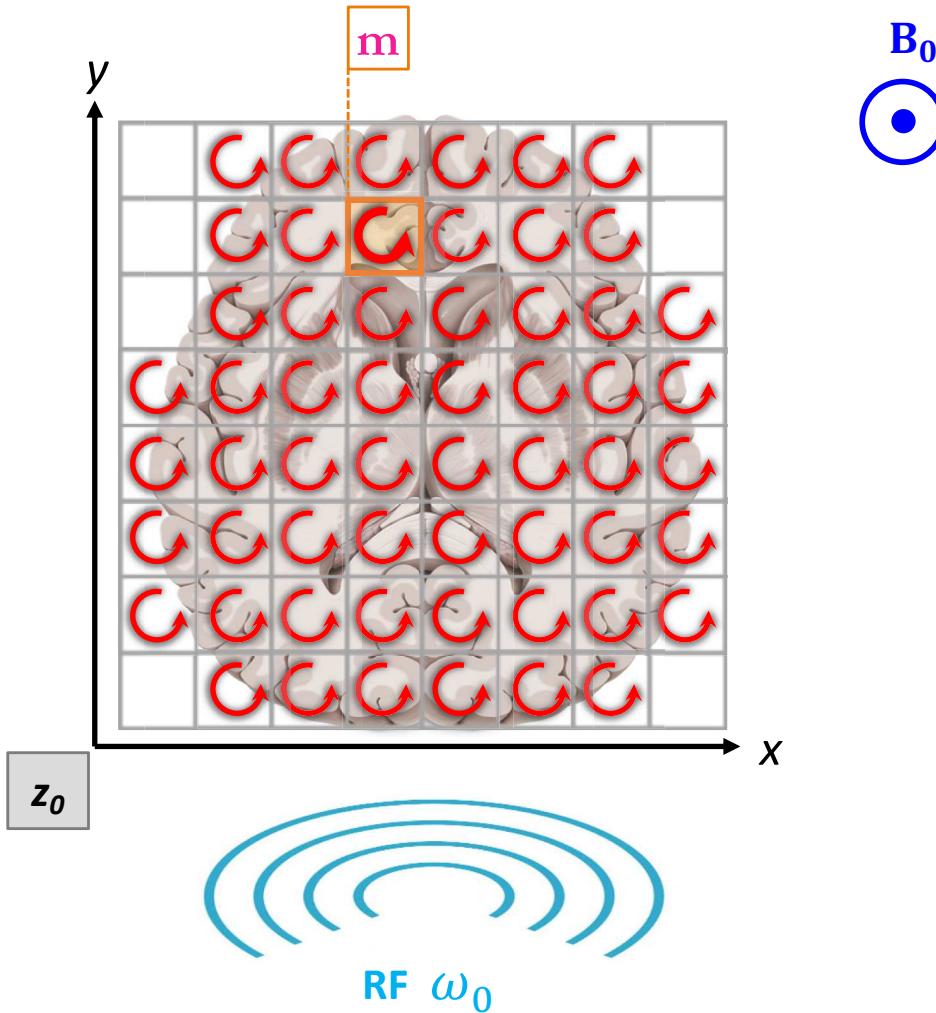
# Formation de l'image



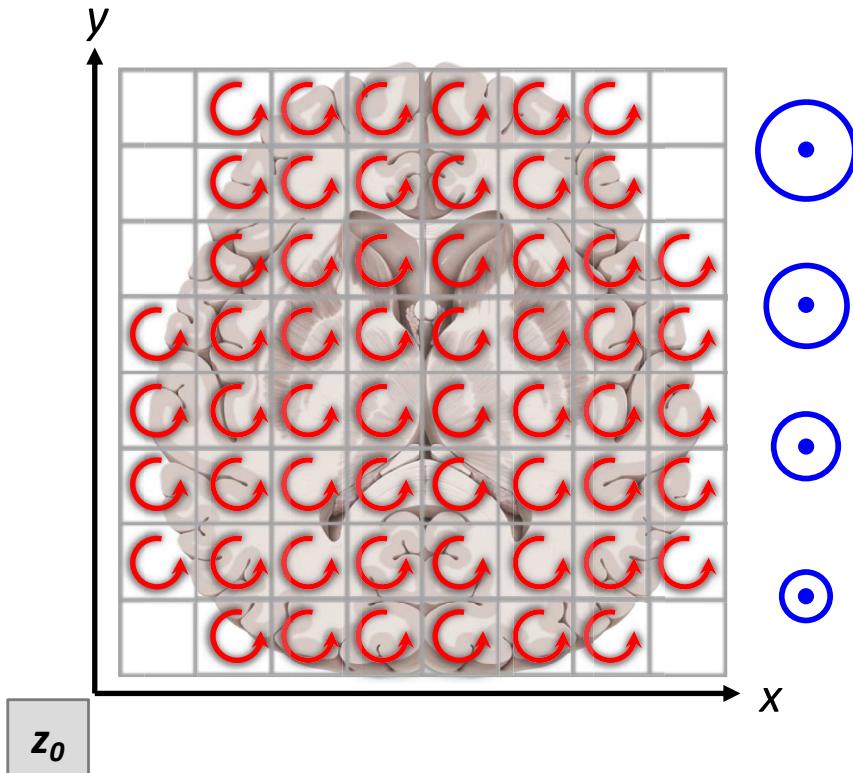
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# Formation de l'image



# Formation de l'image



$\mathbf{B}$  variable (*gradient de lecture*)

$$\mathbf{B} = \mathbf{B}_0 + \mathbf{G}_L (y - y_0)$$

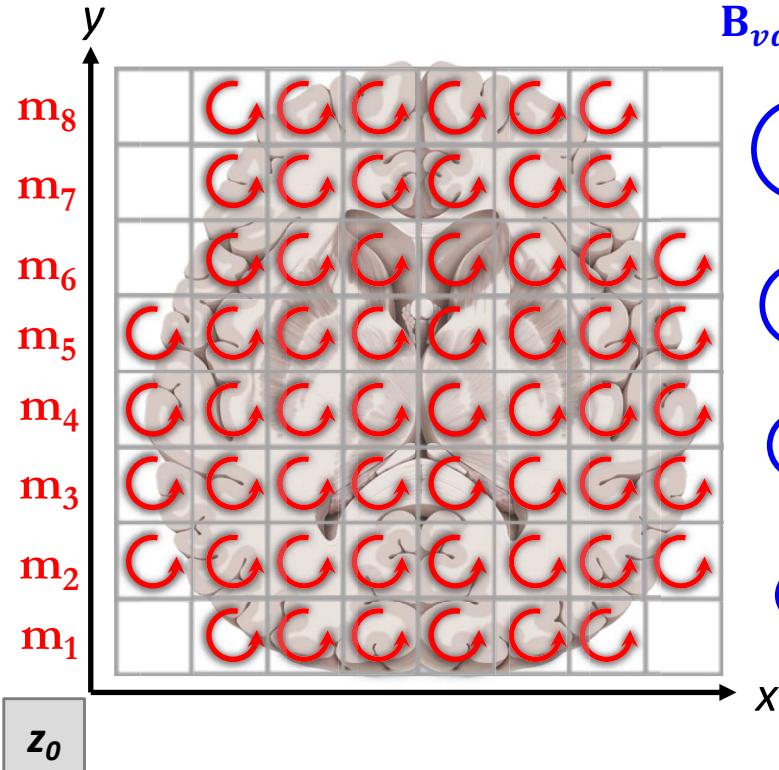
$$G_L = \frac{dB}{dy}$$

$G_L$  appliqué pendant l'acquisition du signal

# Formation de l'image



$$\omega = \gamma \cdot B$$



$B_{variable}$



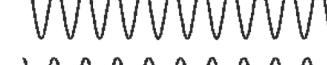
$$\omega_8$$



$$\omega_7$$



$$\omega_6$$



$$\omega_5$$



$$\omega_4$$



$$\omega_3$$



$$\omega_2$$



$$\omega_1$$

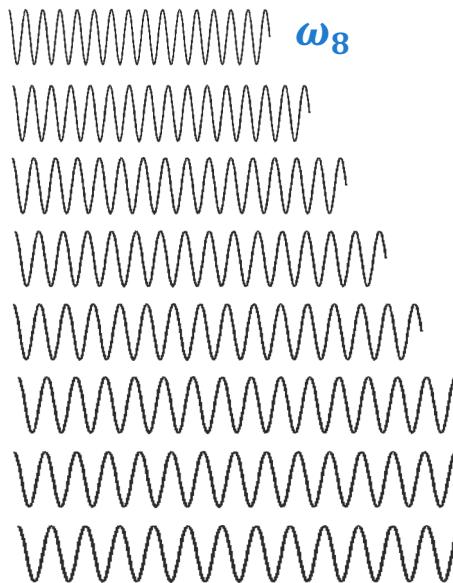
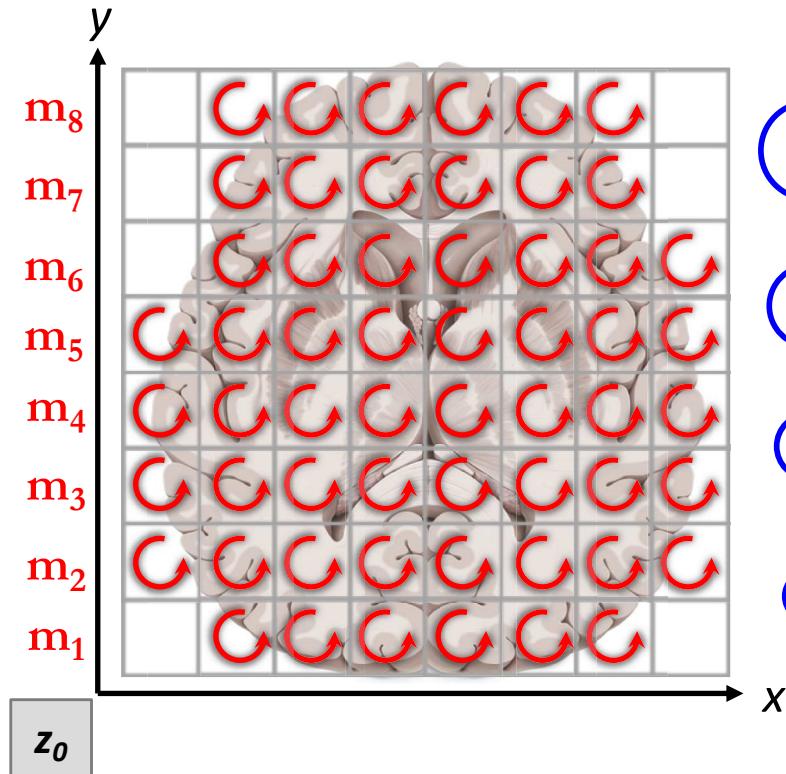
$$\omega_8 = \gamma B_8$$

...

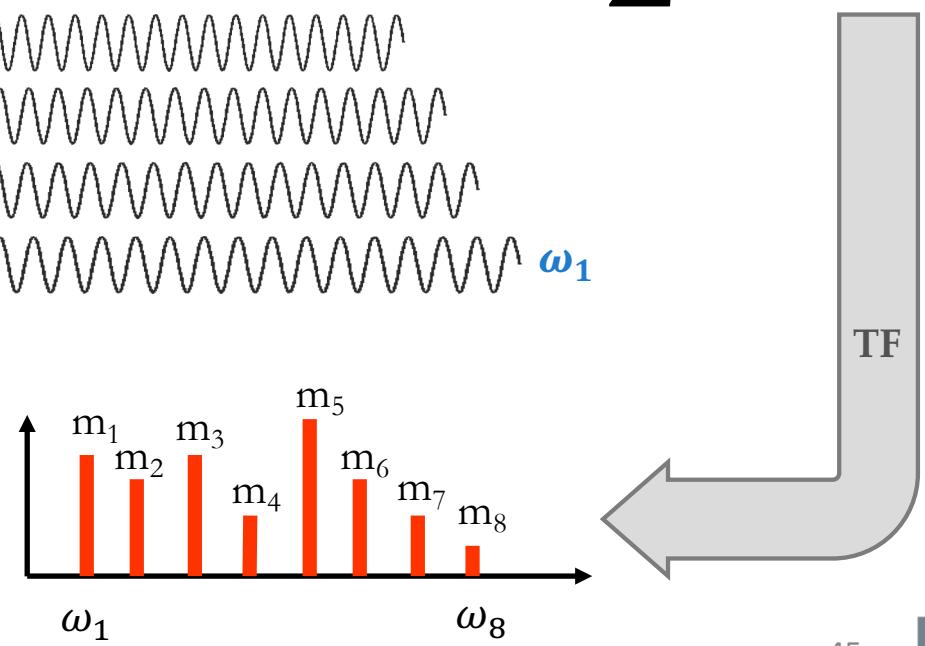
$$\omega_1 = \gamma B_1$$

$$\omega_8 > \dots > \omega_1$$

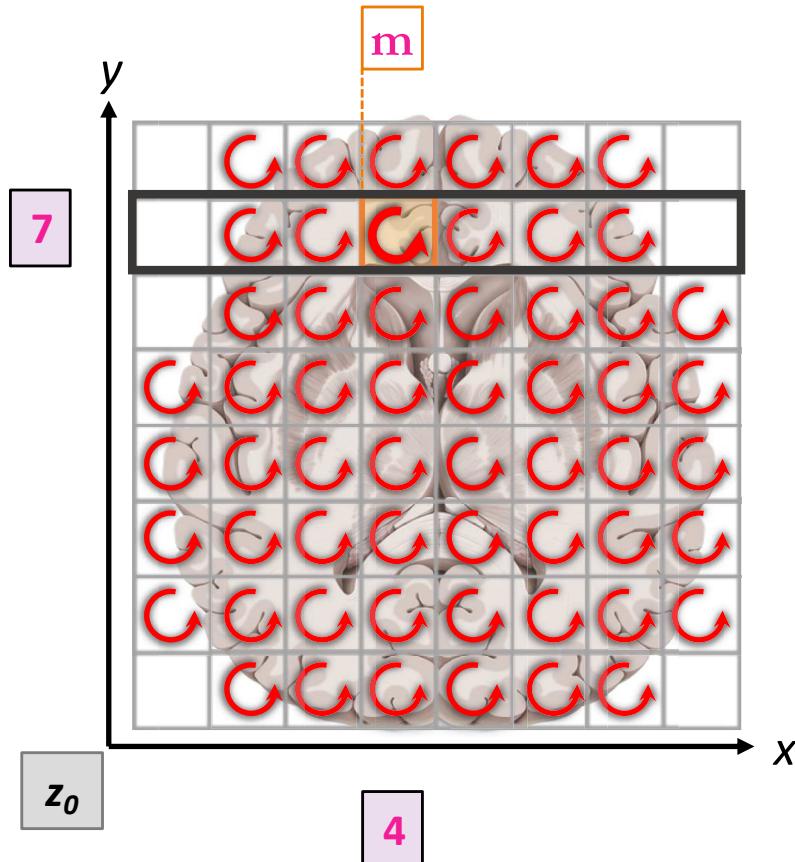
# Formation de l'image



$$\text{FID} \propto \sum m_i \sin(\omega_i t)$$



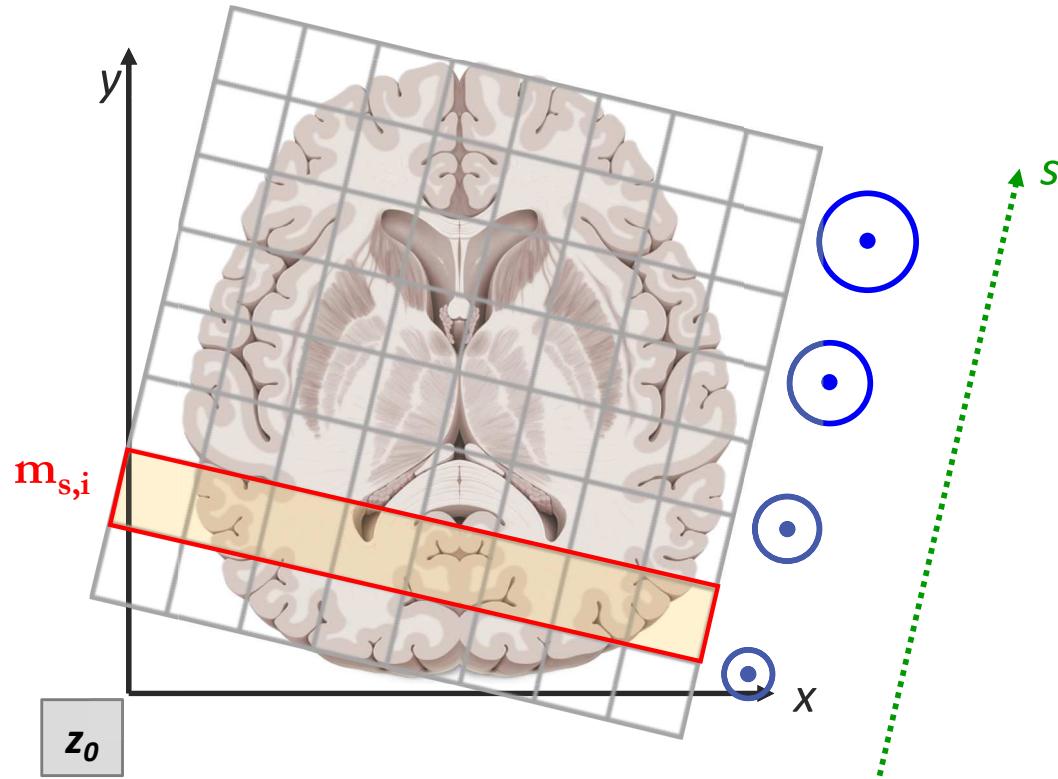
# Formation de l'image



# Formation de l'image



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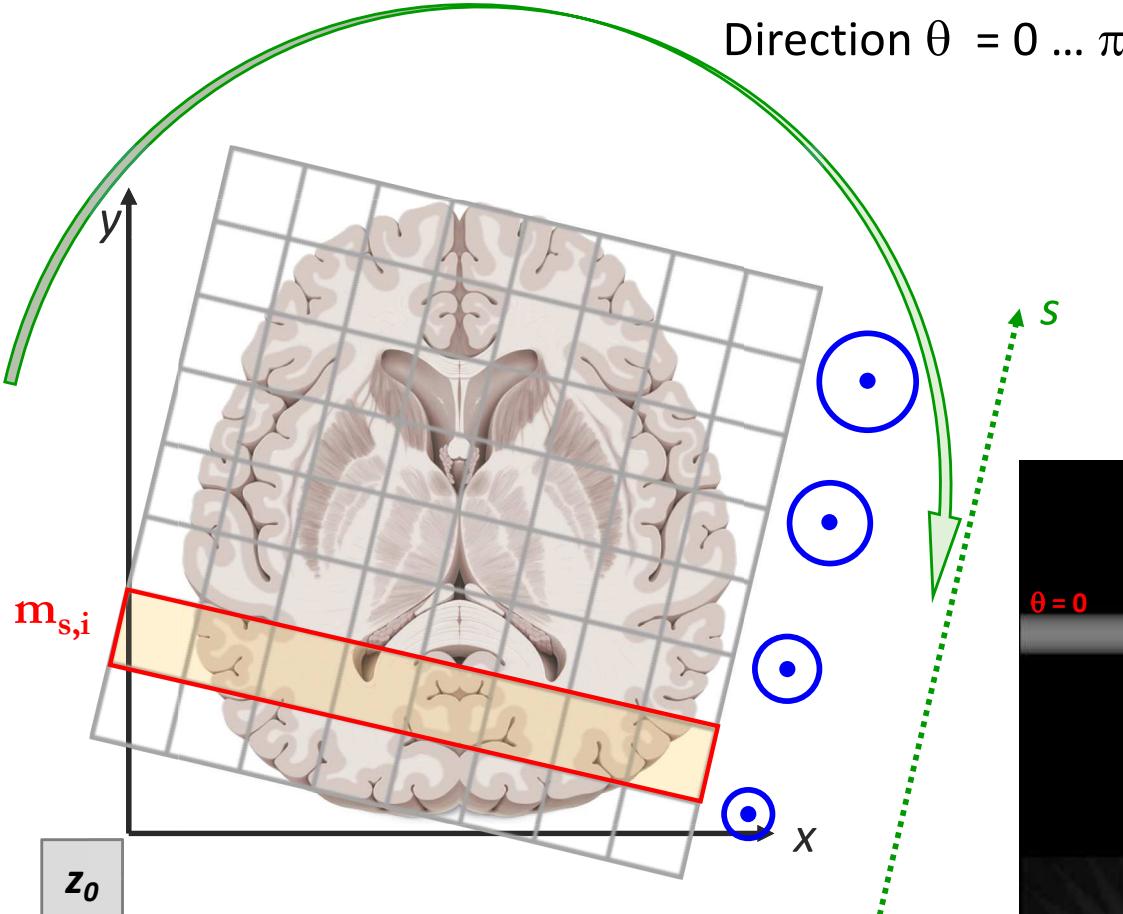


**B variable** (*gradient de lecture*)

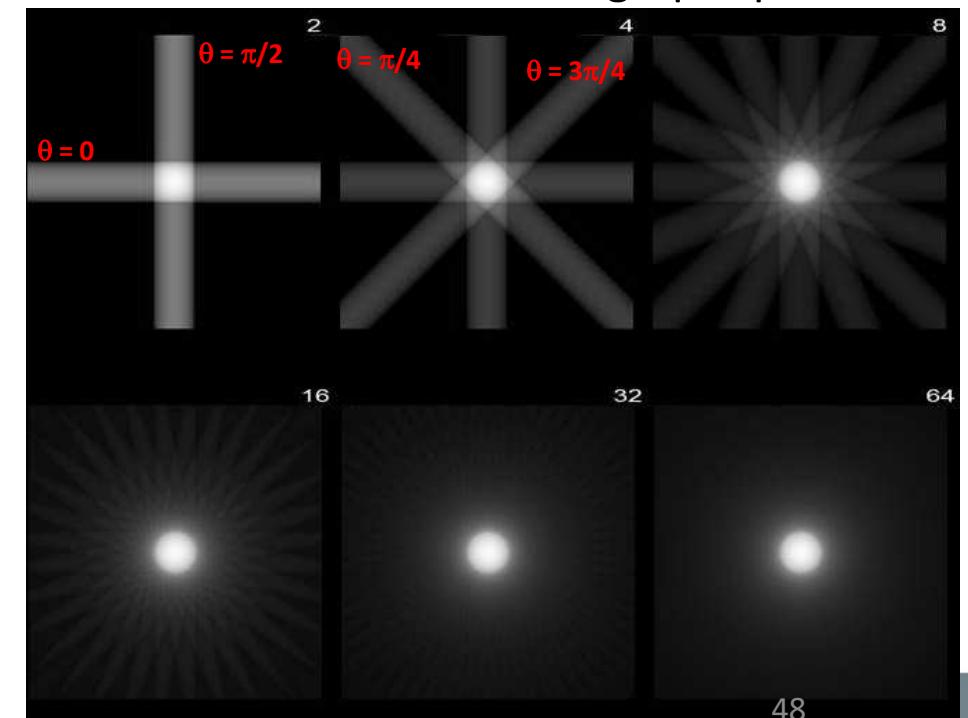
$$\mathbf{B} = \mathbf{B}_0 + \mathbf{G}_L (\mathbf{s} - \mathbf{s}_0)$$

$$G_L = \frac{dB}{ds}$$

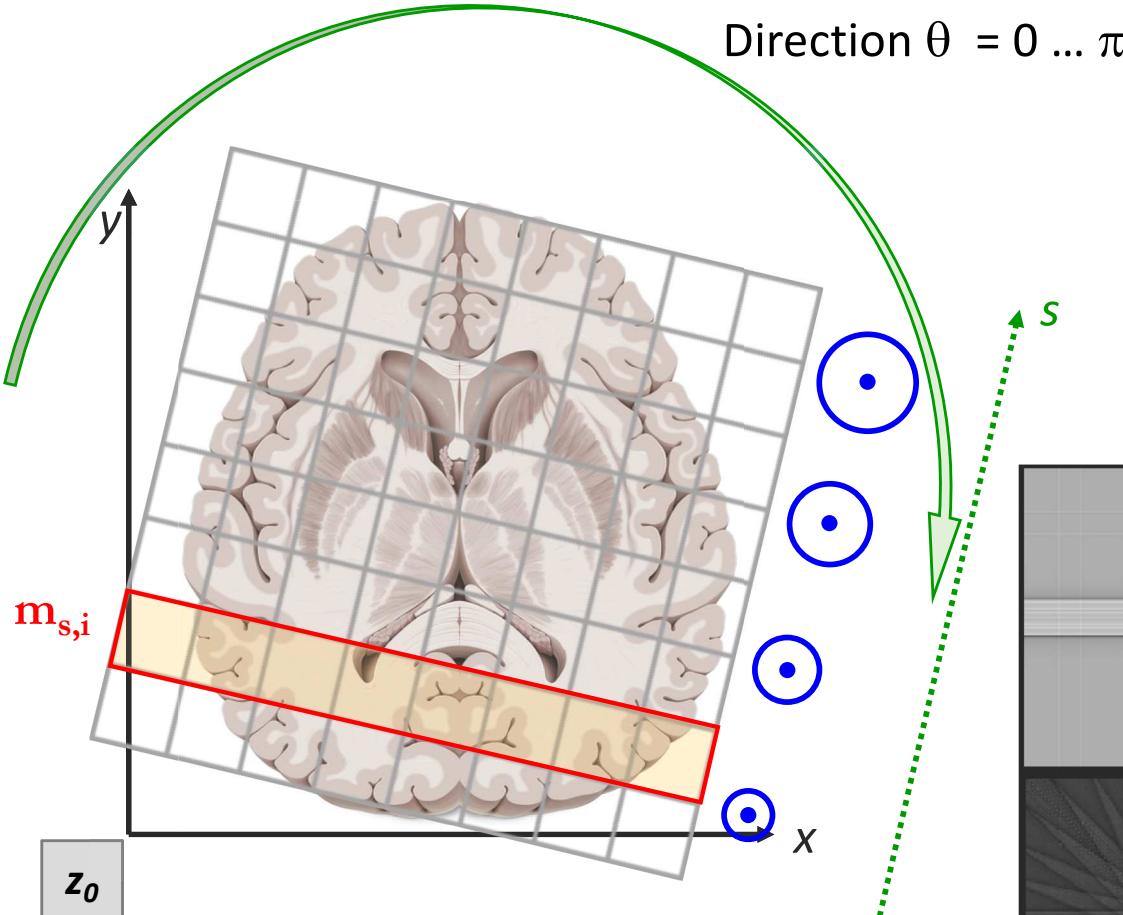
# Formation de l'image



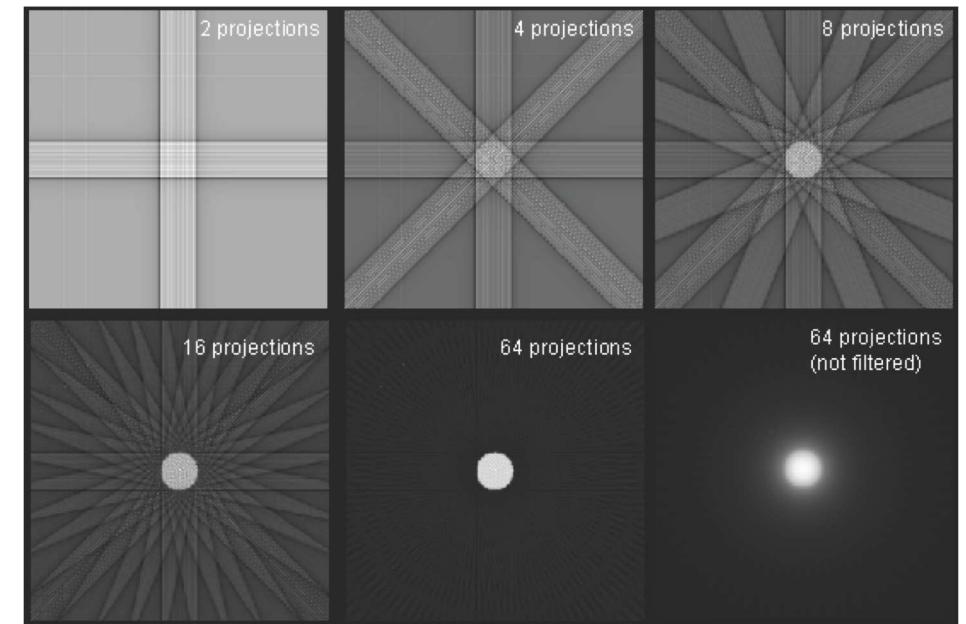
Reconstruction tomographique



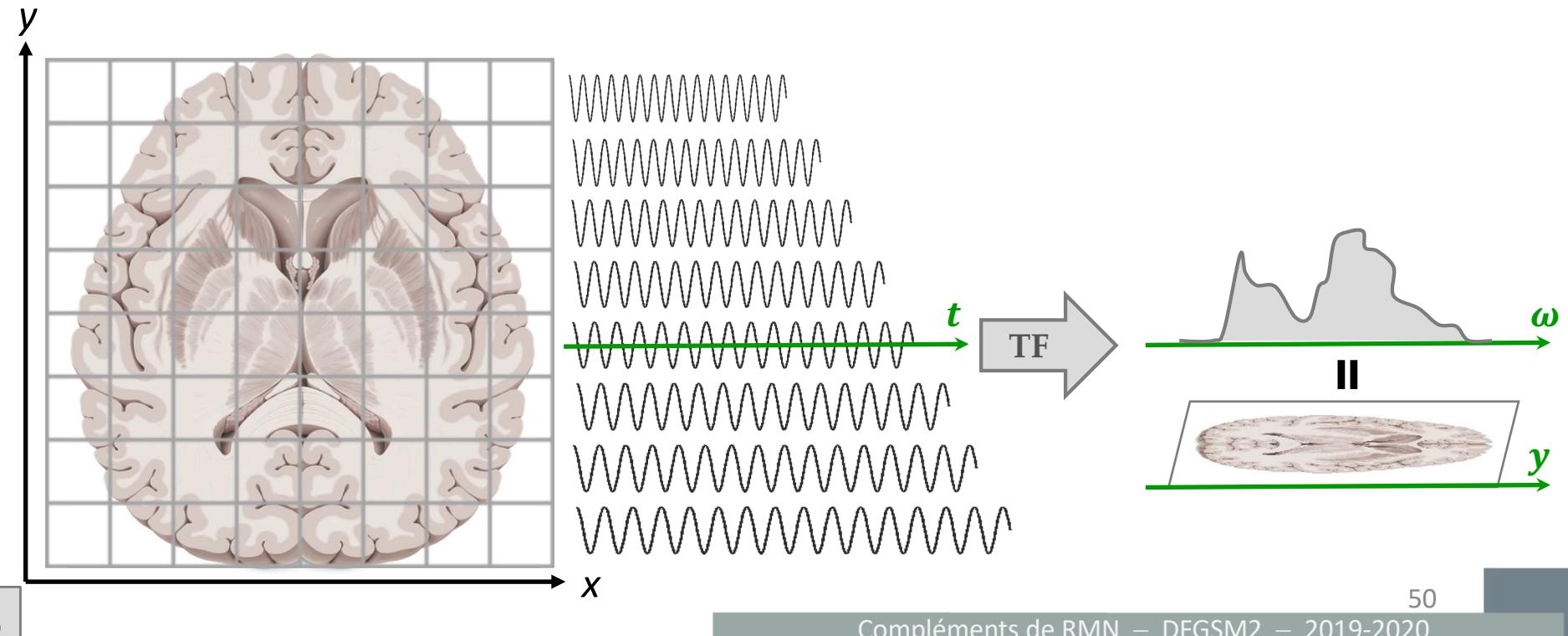
# Formation de l'image



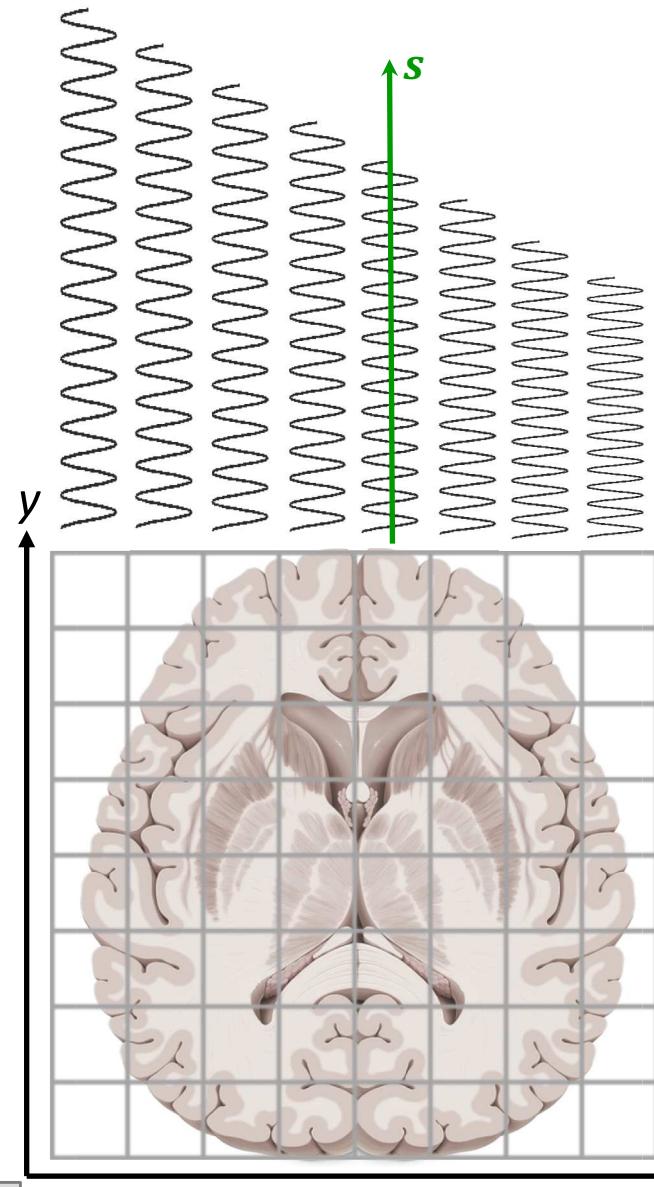
Reconstruction tomographique



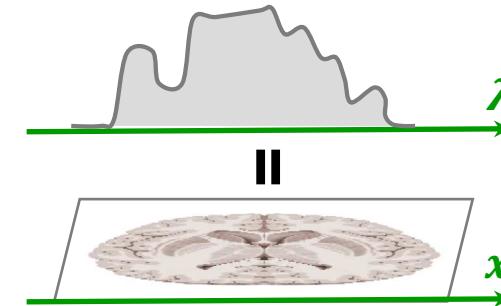
# Formation de l'image



# Formation de l'image

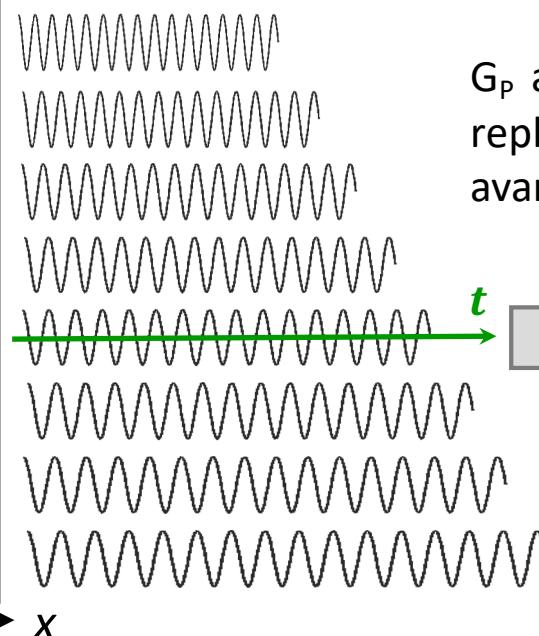


TF

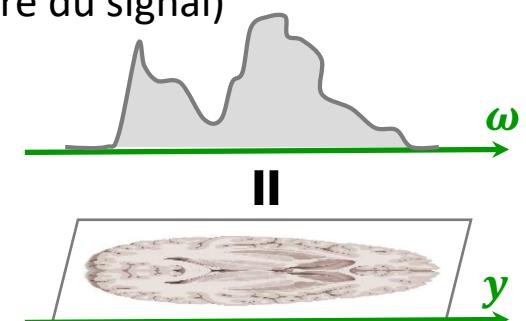


## $G_P$ (gradient de phase)

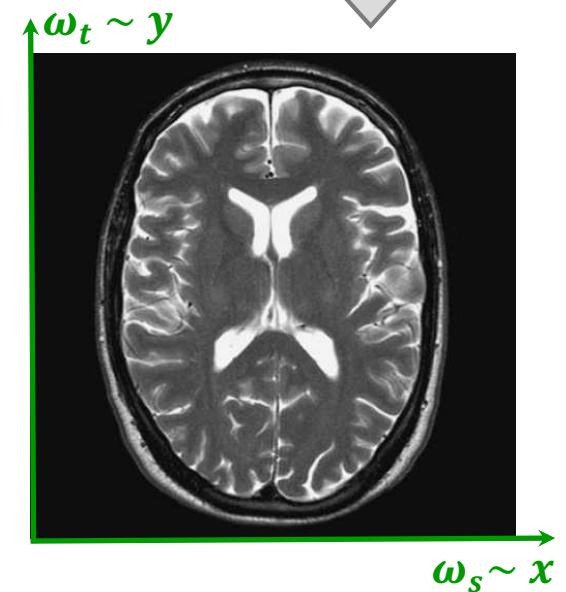
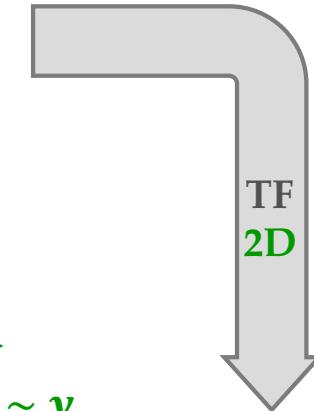
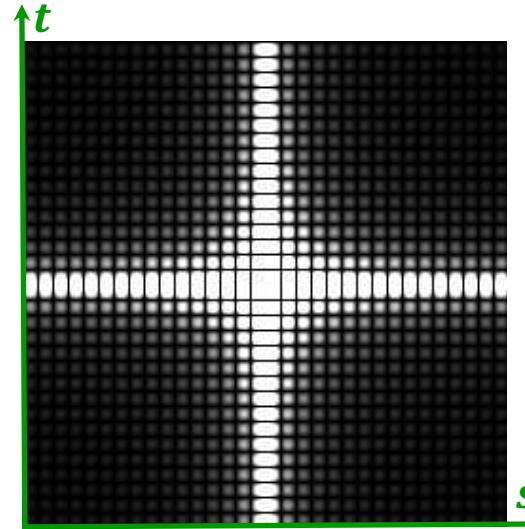
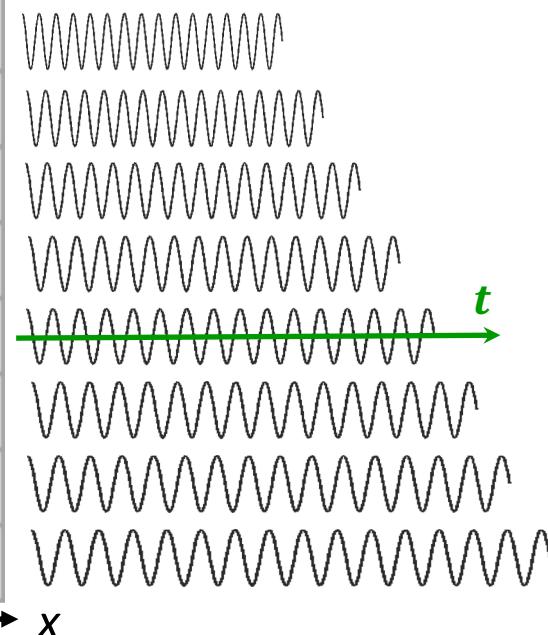
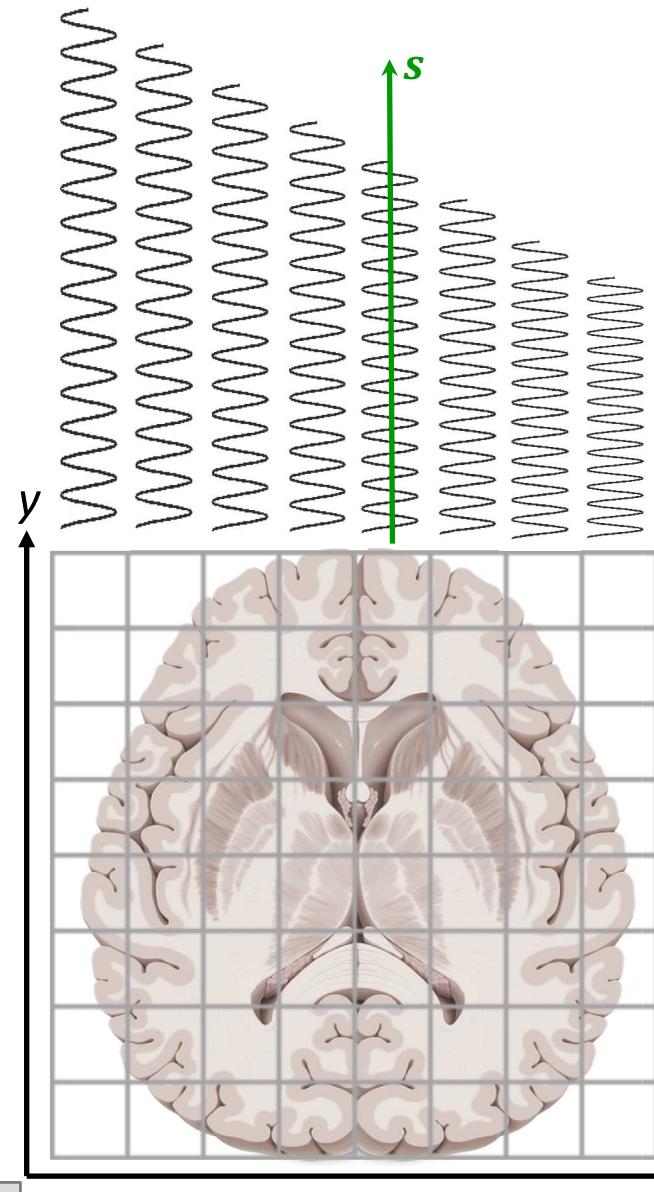
$G_P$  appliqué entre impulsion initiale et rephasage des spins (après bascule, avant mesure du signal)



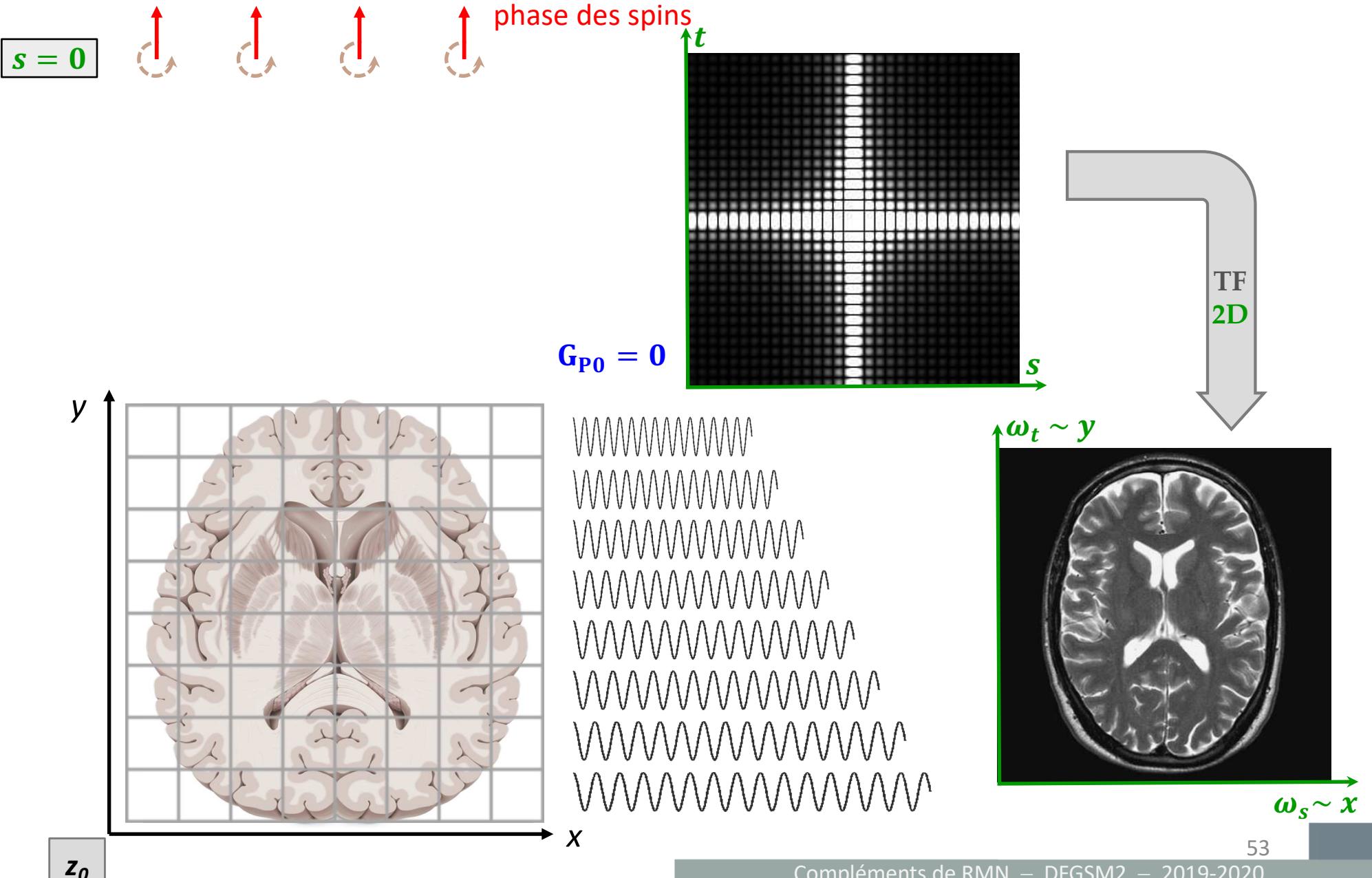
TF



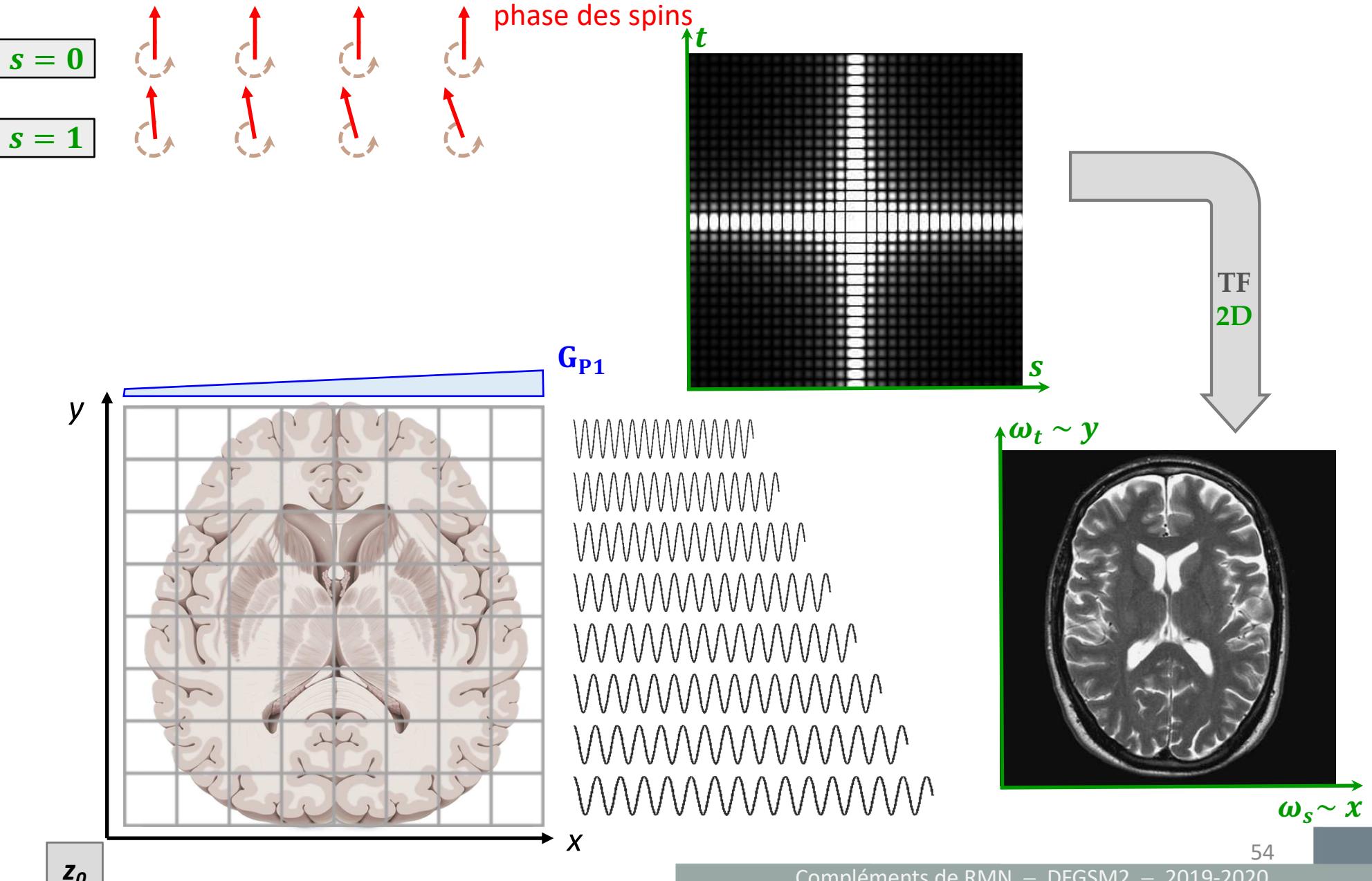
# Formation de l'image



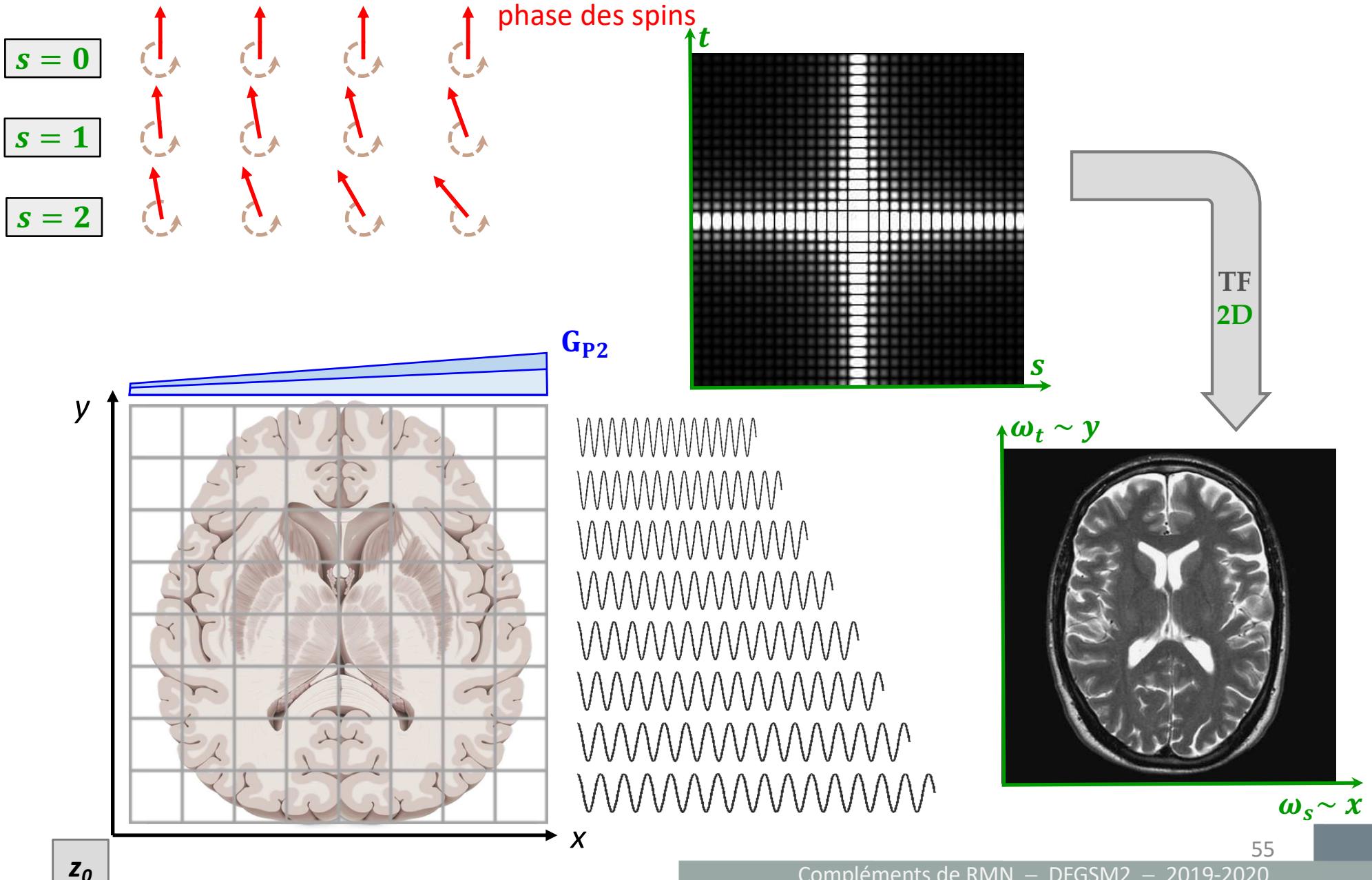
# Formation de l'image



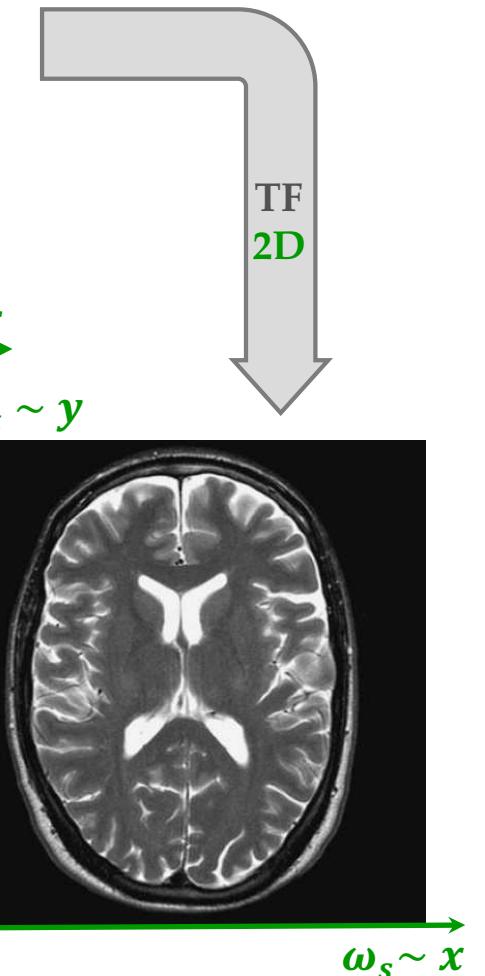
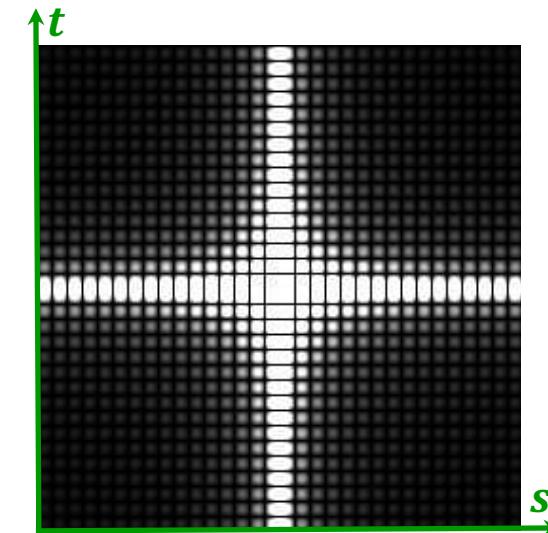
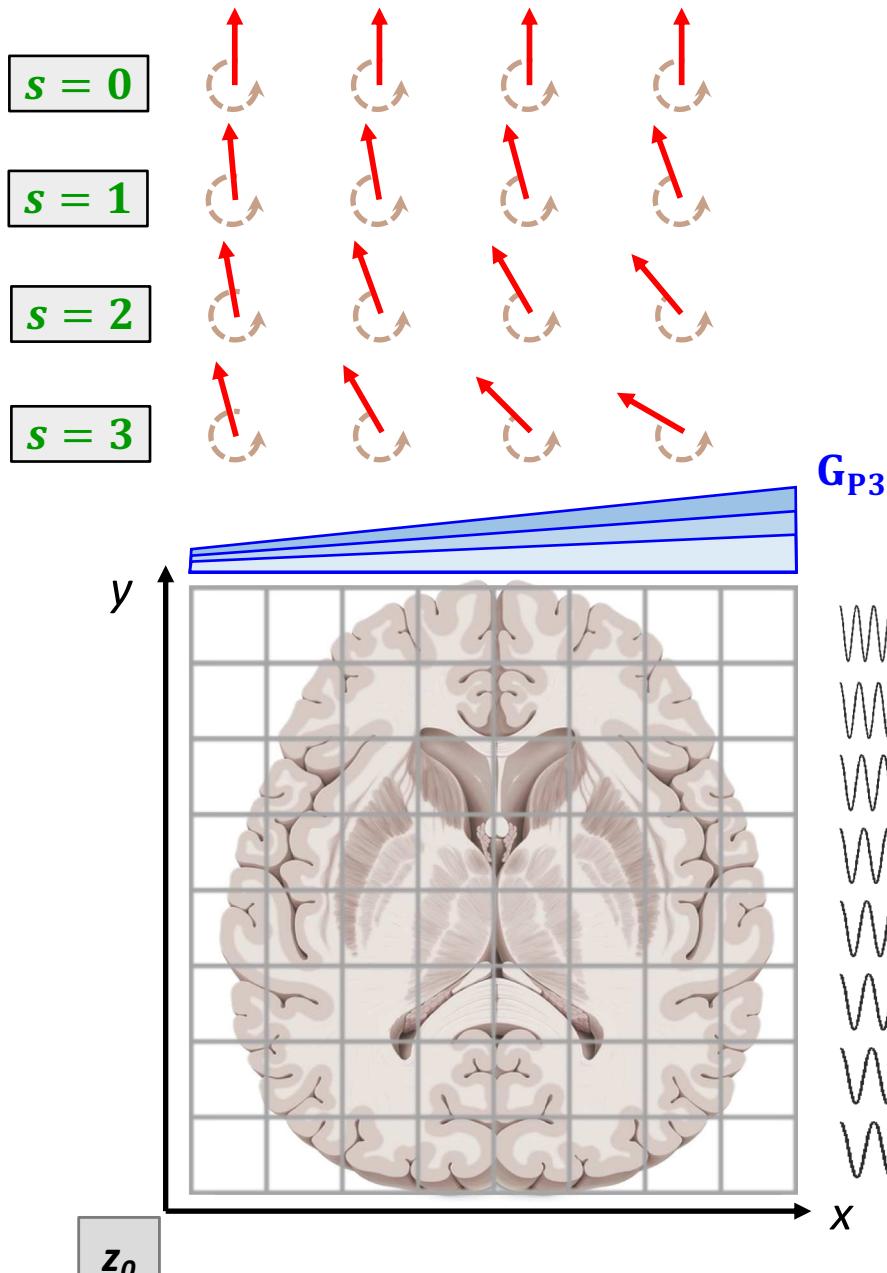
# Formation de l'image



# Formation de l'image



# Formation de l'image



# Formation de l'image

