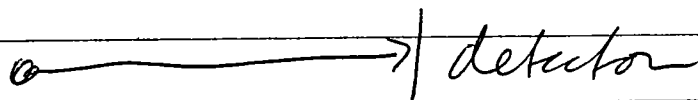
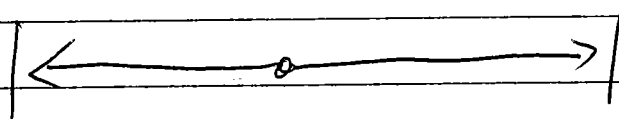


# Transmission Scan.

ENAS 080  
Oct 18, 2011



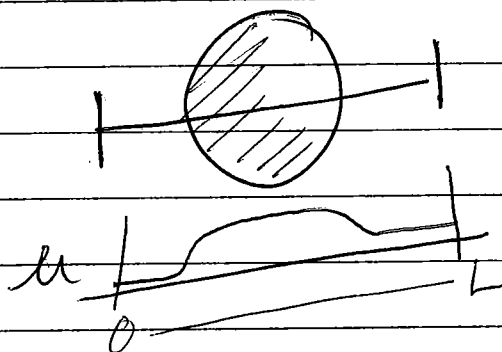
$$p(d) = I_0 e^{-\mu x}$$



$$p(\text{Coinc.}) = I_1 \cdot I_2 = I_0^2 e^{-\mu x} e^{-\mu(L-x)}$$

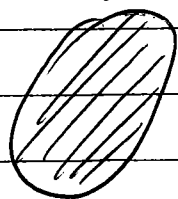
$$= I_0^2 e^{-\mu L}$$

but  $\mu = \mu(x)$

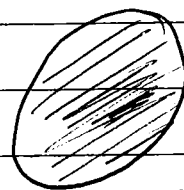


$$\text{So } P(\text{coincidence}) = I_0^2 e^{-\int_0^L \mu(x) dx}$$

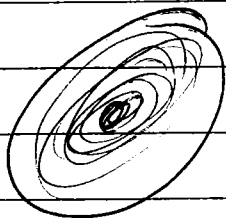
Object.



→ CT scan



map of  $\mu(x, y, z)$



PET  
w/o  
 $\mu$

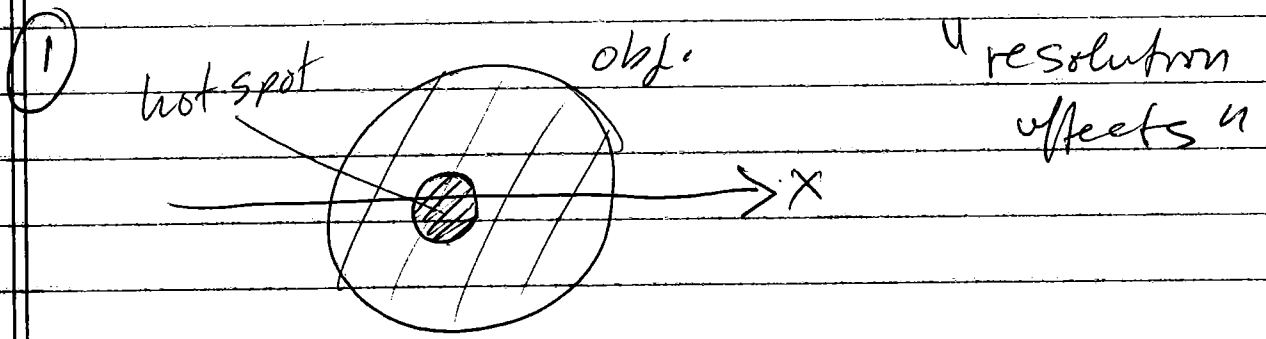
→  
correct  
for  $\mu$



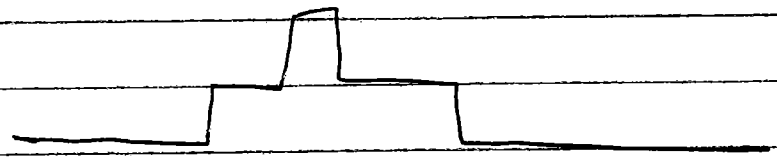
why.?

# Partial Vol.

2 phenomena



ideal scanner sees (along line x)

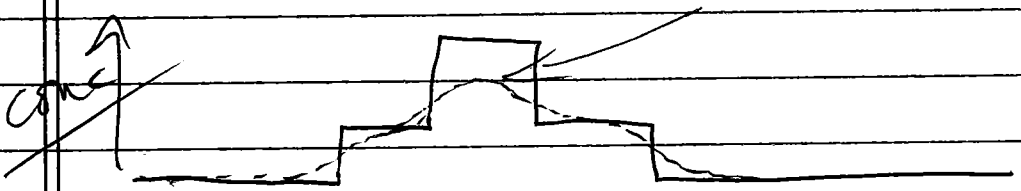
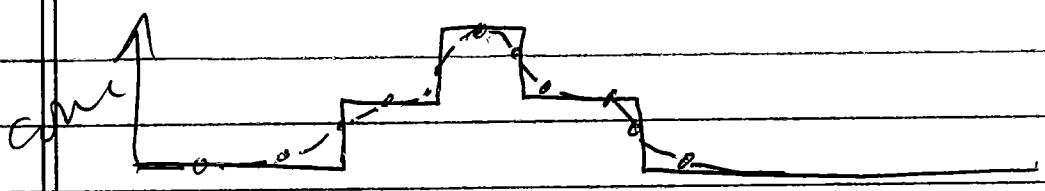


non-ideal scanner sees either

---

or

-o-o-



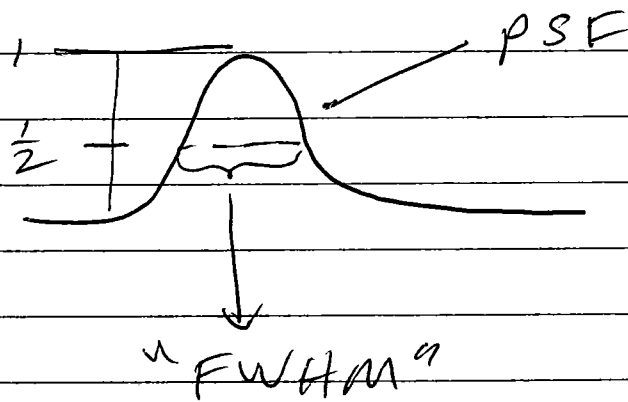
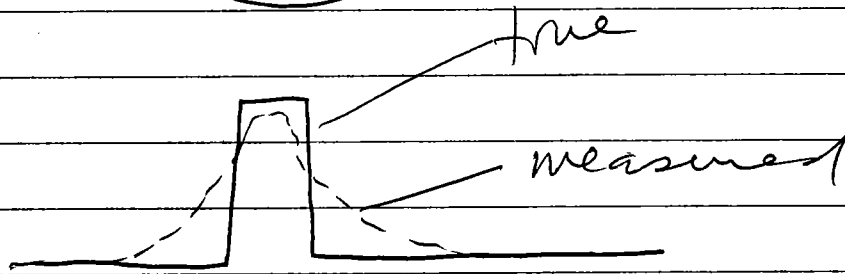
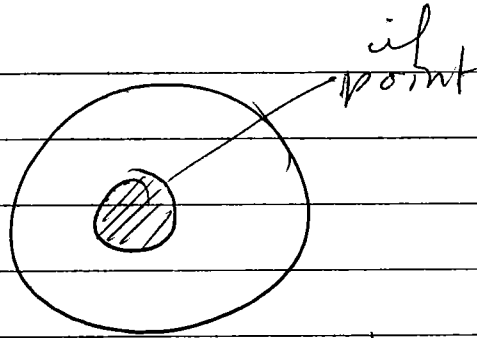
what is diff?

never recover true conc

in small object if  $diam < 2.5 \times \text{Resolut.}$

where  $\text{Resolut} \equiv \text{FWHM}$

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P#3



measure of spread of dot in  
image.