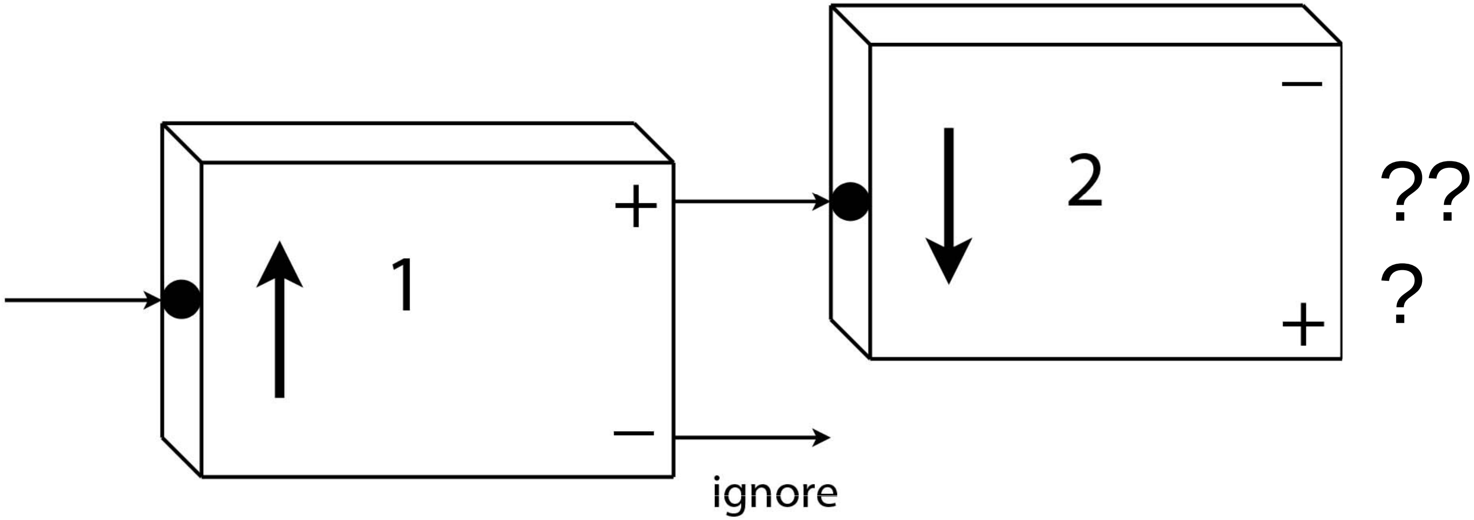
Analyzer 2 is now oriented downward:



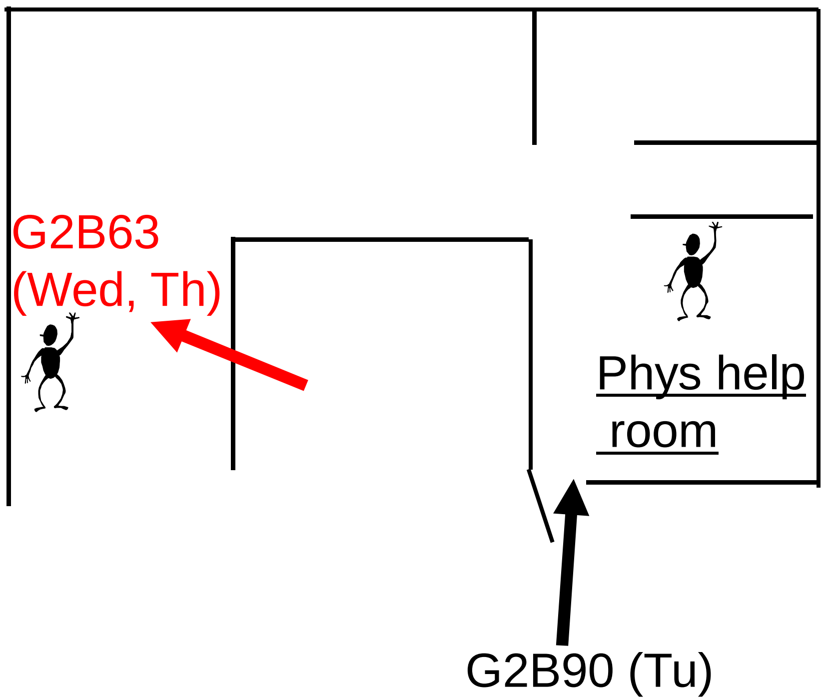
Ignore the atoms exiting from the ***minus-channel*** of **Analyzer 1**, and feed the atoms exiting from the ***plus-channel*** into **Analyzer 2**.

What happens when these atoms enter **Analyzer 2**?

(A) They all exit from the plus-channel.

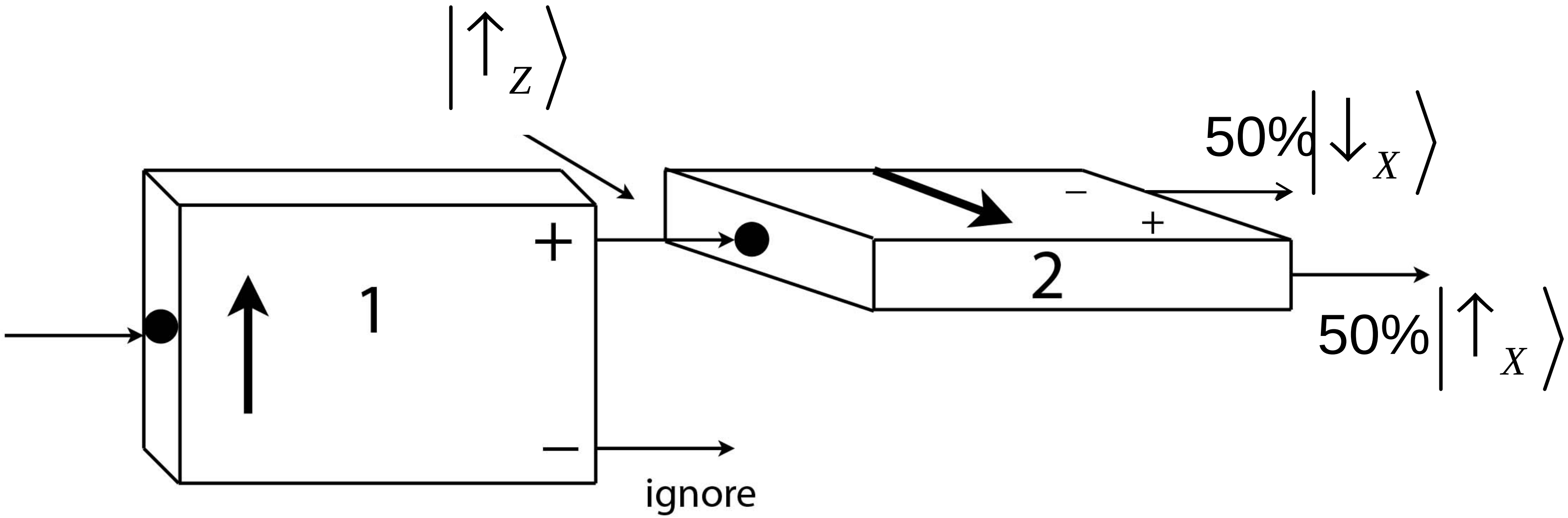
(B) They all exit from the minus-channel.

Problem solving sessions



Tues: in G2B90

Wed and Thurs: in G2B63



What would be the expectation (average) value for magnetic moment?

A) $-m_B$
B) $-1/2\ m_B$
C) 0
D) $+1/2\ m_B$
E) $+\ m_B$

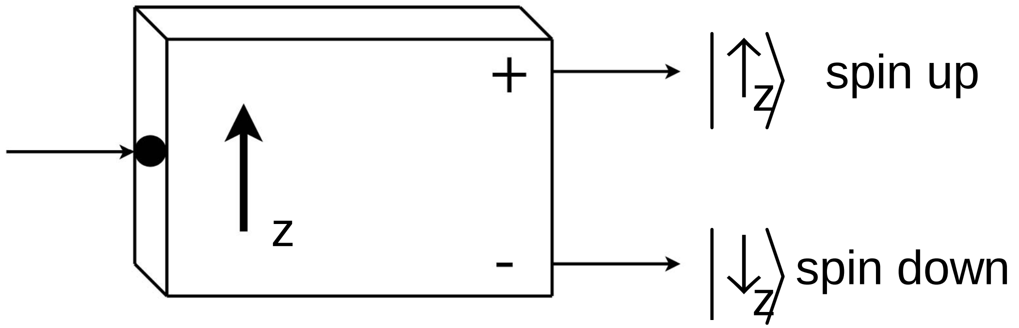
For continuous x

$$\langle x \rangle = \int_{-\infty}^{+\infty} x\ \rho(x)\ dx$$

For Discrete x

$$\langle x \rangle = \sum_{i=1}^{n} x_i P(x_i)$$

For atoms entering with spin up at angle θ (with respect to + axis)



For Θ = 0, 100% = $\cos^2(0^0)$ of atoms exit from "+ channel"

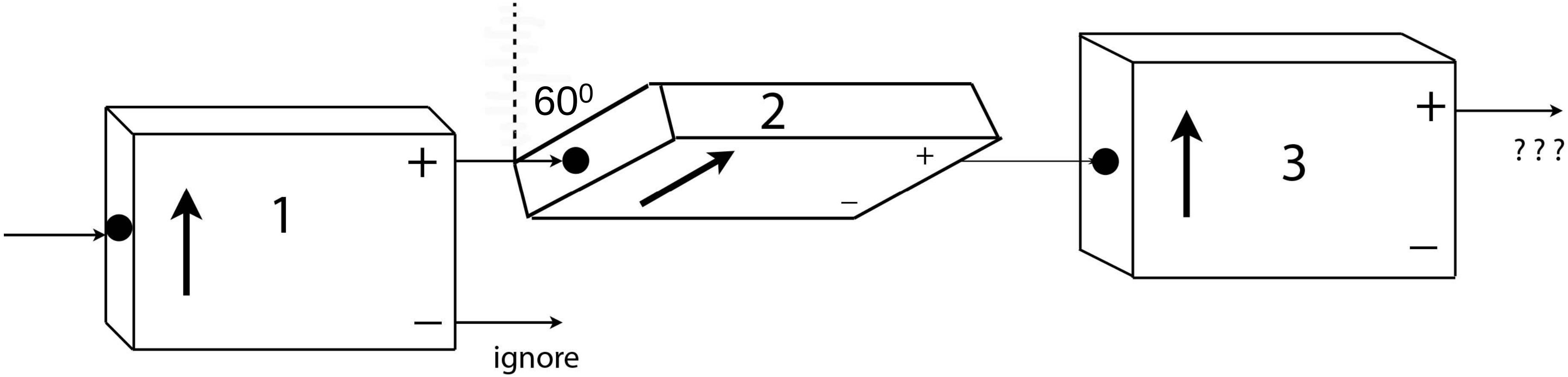
For Θ = 90^0, 50% = $\cos^2(45^0)$ of atoms exit from "+ channel"

For Θ = 180^0, 0% = $\cos^2(90^0)$ of atoms exit from "+ channel"

For arbitrary Θ: atoms exit + channel with probability: $P\left[\left|\uparrow\right\rangle\right] = \cos^2\left(\frac{\theta}{2}\right)$

What is the probability that atoms (for arbitrary Θ) exit "– channel"?

$$P\left[\left|\downarrow\right\rangle\right] = \sin^2\left(\frac{\theta}{2}\right)$$

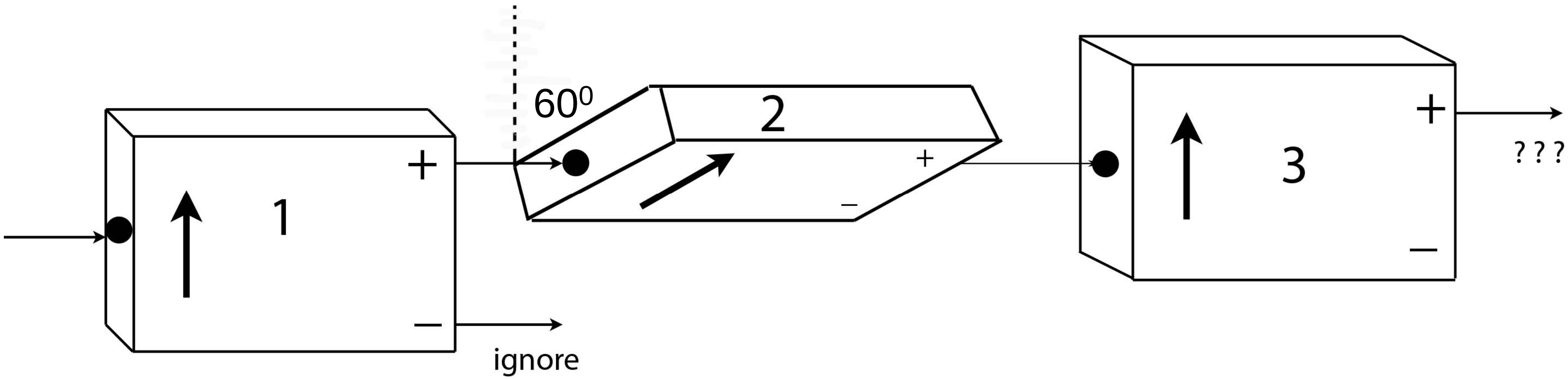


Instead of horizontal, suppose **Analyzer 2** makes an angle of 60^0 from the vertical. **Analyzers 1** & **3** both are in +z direction.

What is the ***probability*** for an atom leaving the ***plus-channel*** of **Analyzer 2** to exit from the ***plus-channel*** of **Analyzer 3**?

(A) 0% (B) 25% (C) 50% (D) 75% (E) 100%

Hint: Remember that $P\left[\left|\uparrow_\theta\right\rangle\right] = \cos^2\left(\frac{\theta}{2}\right)$



What is the ***probability*** for an atom entering **Analyzer 1** to exit from the ***plus-channel*** of **Analyzer 3**?
(Use: P(1+) = probability to exit + channel of analyzer 1)

(A) $P(1+)+P(2+)+P(3+)$

(B) $P(1+)-P(2+)-P(3+)$

(C) $P(1+)\times P(2+)\times P(3+)$

(D) $P(1+)\div P(2+)\div P(3+)$

(E) Other