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كتابة العربية : الفقرة الرابعة فيزياء

مقرر : الرنين المغناطيسي (Phy 425) Magnetic Resonance

Nuclear Spin:

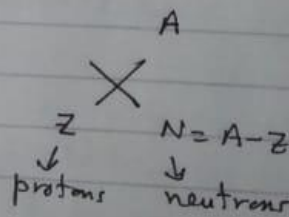
It is known that NMR works on the magnetic moment of the protons in the human body. But the water molecules contain both Oxygen and Hydrogen atoms, so why Oxygen is not considered in the NMR experiment?

There are general rules that govern nuclear spin, these are:

For class #1, if A is even and Z is even
N is even, so nuclear spin is zero.

Examples: $\begin{matrix} 12 & 16 & 4 \\ \text{C} & \text{O} & \text{He} \\ 6 & 8 & 2 \end{matrix}$

where the notation is :



So the nuclei with zero spin are not detected by NMR.

Class #2 : N is odd and Z is odd
i.e. A (is even) = N + Z
 $\begin{array}{c} \uparrow \quad \downarrow \\ \text{odd} \quad \text{odd} \end{array}$

(2)

Examples: N^{14} , H^2 , B^{10}
For these nuclei, the spin is integer
and they are detected by NMR.

Class #3: All other cases: odd/even
and even/odd i.e. Z: odd but
N is even or Z: even but N is odd.
in this case A is odd, and these
nuclei have half-integer spin.

Examples: H^1 , C^{13} , O^{17}

These are also detected by NMR.

Homework:

Find other nuclei that could be detected
by NMR and others that couldn't be
detected.

المحاضرة القادمة عن أنواع المقاطبات يمكن استخدامها
في جواز الرنين المقاطبي

المحاضرة بعد القادمة عن التأثيرات البيولوجية للرنين
المقاطبي.