Student name: _____ Date: _____ [tab-a028]

[Exercise]

- Using the symmetry of the radical deduce the number of equivalent groups.
- Counts the number of experimental lines; calculate the number of theoretical lines (Eq. (9)); write down both values and observe the difference.
- Measure (with the mouse) the heights of the three first lines of the spectrum. From these heights deduce if the smaller splitting arises from the two atoms of N or from the four equivalent H of the ring, since both would give a quintet but with different relation of intensities.
- Measure the distance between the lines 2 and 3. This distance is the same than that between the lines 1 and 2.
- Seek the lines that form the first quintet and from the line 4, with the distance 1-2 find the 2^{nd} quintet. Write down the lines that form the first and the second quintet of the spectrum.
- The distance among the central lines of the previous quintets (lines 3 and 10) is the second hyperfine splitting (it can also be measured among the lines 1-4).
- With the distance among the lines 3-10, find the following multiplet (triplet or quintet?); Write down the lines of that multiplet.
- Measure the length of the experimental spectrum and apply the Eq. (8) to calculate the third hyperfine splitting.
- From the center of the spectrum (line 35), write down the lines that are generated when the third splitting is applied.
- Measure the heights of all the lines to determine the order (multiplicity) of the hyperfine splitting.
- In the form of results that you print with the simulator, number the nuclei of the radical and assign the hyperfine splittings to each nucleus showing the positions that are equivalent.

Table for the interpretation of 1,4-dihydro pyrazine cation radical [a028].

L (spectrum) = ... mT. $N_{theoretical}$: ..... $N_{experimental}$: .....

Multiplet	Lines	Lines intensities	
1^{st} quintet (distance 2-3)	1, 2, 3, ...	Pixels	
		Normalized	
		Theoretical	
2^{nd} quintet (distance 2-3)	4, ...	Pixels	
		Normalized	
		Theoretical	
2^{nd} multiplet (distance 3-10)	3, 10, ...	Pixels	
		Normalized	
		Theoretical	
3^{th} multiplet	.... 35, ...	Pixels	
		Normalized	
		Theoretical	