Questions are based on

Observation of the hyperfine spectrum of antihydrogen

(M. Ahmadi et al.)

Theory

1. What are the differences between the Fine Spectrum, the Lamb Shift and the Hyperfine Splitting in terms of a \( \bar{H} \)-atom? **Utsav**

2. The authors assume that the energy levels of \( \bar{H} \) will be similar to those of \( H \). The plasma frequency was set according to this. How would the result be affected if this was not true? **Mahesh**

3. What are the angular momentum quantum numbers of the positron in a \( \bar{H} \) atom? **Som**

4. Why is the CPT invariance important for anti-matter? Why is \( \bar{H} \) good candidate to look at when testing CPT invariance? How else can this data be useful other than for a CPT test? **Matt**

Experiment

1. Are there other experiments that can be carried out by using ALPHA2 detector? **Tyler**

2. Why is the injection ratio of \( \bar{p} \) and \( e^+ \) not 1:1? **Cole**

3. Has \( \bar{H} \) lamb shift or fine structure of \( \bar{H} \) been observed? **Ibrahim**

4. What is a microwave induced spin flip? What does \( |c\rangle \rightarrow |b\rangle \) and \( |d\rangle \rightarrow |a\rangle \) spin flip mean? Why are they not considering \( |c\rangle \rightarrow |a\rangle \) or \( |d\rangle \rightarrow |b\rangle \) spin flips? **Sudhanva**

5. What are trappable and untrappable states? Why are the spin up positron states of \( |a\rangle \) and \( |b\rangle \) untrappable? Why is the relative energy of the states seems to depend on positron spin only? **Mamun**

6. Why did they use three layers of annihilation detectors? **Robert**

7. What is the difference between low-field and high-field seeking states? Why do the states seek low or high fields? **Gula**

General

1. How are antiprotons produced? **Kristyn**

2. What is a Penning trap? How is it different from modified Penning-Malmberg trap? How does the ‘modified Penning-Malmberg trap’ trap neutral atoms? What is the role of the trap electrodes? **Shiv**

3. Is there any interaction between two antihydrogen atoms? **Nadyah**

4. How is the result useful in NMR? **Doug**