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WHAT IS THE CAUSE FOR THE 6 CM HYDROGEN RADIATION? WHAT IS THE CAUSE FOR THE 21 CM HYDROGEN RADIATION?

Quantum jumps or spin flip are impossible explanations

What is the cause for the 6 cm hydrogen radiation?

In terms of current theory a 6 cm radiation corresponds to a photon with a frequency of $5 \cdot 10^9$ Hertz and an energy of $20.6 \cdot 10^{-6}$ eV. To explain this tiny energy, physicists had to find out a corresponding quantum jump. The trial and error method showed that an electron must jump from the 139th to the 137th orbit in order to create a photon with $20.6 \cdot 10^{-6}$ eV energy! [voigt] (The formula for the energy is: $13.6 \text{ eV} (1/137^2 - 1/139^2)$).

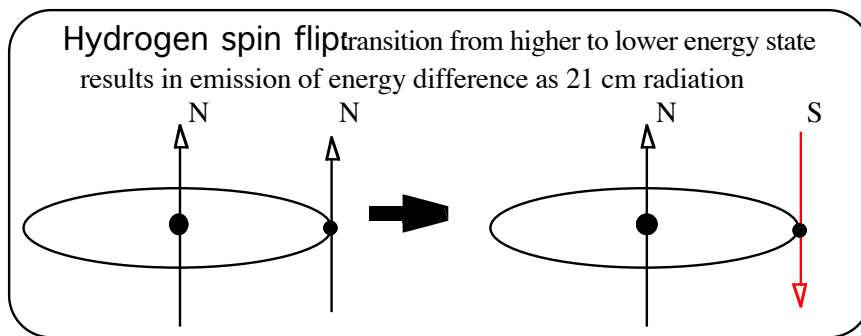
The radii of these orbits are huge. The formula for the radii is $r = n^2 r_1$, where r_1 is the Bohr radius $5.3 \cdot 10^{-11}$ m. For $n = 137$ we obtain $r = 9.9 \cdot 10^{-7}$ m and for $n = 139$, $r = 10.2 \cdot 10^{-7}$ m. As a result the atom is inflated about 20 000 times! One must ask the question: What is the reason that in this range there occurs only this jump from the 139th level to the 137th one in nature? Why are there not other jumps that correspond to 1cm, 2cm, 3cm, radiation? In any case, every occurring wavelength can be explained by an electron jump because the number of orbits is not limited. The Bohr model is therefore more successful to explain the phenomena (numerically) than the model of Ptolemy because to add 137 epicycles would be abstruse. But for a given photon energy there is not only one possibility for a jump that corresponds to this energy. If so many orbits are possible, then also a jump between other orbits may have about the same energy! This is the real uncertainty principle of the Bohr model: the correspondence between measured wavelengths and the alleged quantum jump is arbitrary.

What is the cause for the 21 cm hydrogen radiation?

The most important spectral line in astronomy is the 21 cm hydrogen radiation with about 1430 MHz. In terms of the Bohr atomic model this line must correspond to a transition of the electron with a very tiny energy difference.

Surprisingly, physicists did not explain this tiny energy by an electron jump! Such an electron jump, say from the 212th level to the 210th level, seemed to be very improbable. Why? The calculated photon energy for this jump is $5.81 \cdot 10^{-6}$ eV and therefore in range of the values for the 21cm radiation that is about $5.84 \cdot 10^{-6}$ eV. But the radius for the 212th orbit is 45 000 times the Bohr radius!

Now is the arbitrary claim that the electron does not jump between orbital energy levels in this case but that this *hyperfine* transition is a change in the direction of the spin axis in the ground state. Allegedly the state with parallel proton and electron spin axes changes into a state with an anti parallel axis direction of the electron. The tiny energy difference between the two states becomes converted into a 21 cm photon...



As the cosmic hydrogen should tend to achieve its lowest possible energy state, why is not all

the hydrogen in the galaxy in the lower energy state by now? Consequently there should be no 21 cm radiation! One explanation was that there are enough atomic collisions to boost the electron into the higher energy states... The answer raises a new question: only for collisions with the quantized minute energy of about $6 \cdot 10^{-6}$ eV required to change the spin state absorption takes place. Collisions with a bit more or less energy must be without any effect! Collisions must exercise a peculiar selectivity with respect to the values energies can take on! But not only the selectivity is very strange. Also the mechanism that causes a spin to flip is the classical *black box* situation. How is the torque produced that flips the spin?

According to quantum physics the calculated energy difference for the spin flip is $5.84 \cdot 10^{-6}$ eV with corresponding wavelength and frequency of 21.2 cm and 1.414 GHz, respectively.[br] Observations from several different regions of interstellar space show that the peaks of the 21 cm radio spectral lines do not all lie at the theoretically required 21.2 cm wavelength. One explanation given is *because the gas in the Galaxy is moving with respect to Earth*. [nju] But the peaks should also shift with temperature. Like for blackbody emission the peaks move to shorter wavelengths as the temperature in the interstellar spaces increases. A wave from distant stars undergoes a loss of energy. For such a minute energy this loss of energy is important... The claim for 'empirical confirmation' of the spin flips is untenable. In such a manner Ptolemy's geocentric model with its eccentrics, deferents and epicycles was 'empirically confirmed' due to the observed retrograde motion of e.g. Mars.

The spin flip speculation is very implausible. A plausible alternative is the assumption that in the cold interstellar space the oscillating hydrogen atom has a natural frequency of >1.4 GHz that causes a vibration of the cosmic electromagnetic medium with about 1.4 GHz.

The 21 cm radiation was categorized as *hyperfine* structure. Another variety of the hyperfine structure is caused by the spinning nucleus and its interaction with the orbit of the electron. We need not go into the details because the existence of orbiting electrons is physically impossible and has therefore never been empirically confirmed.

References

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