

Nuclear Lunch Questions for 25 September 2013

Follow-up to the article:
How Stable is the Photon?,
Julian Heeck
Phys. Rev. Lett. **111**, 021801 (2013)

1. What makes QED a low energy approximation of the GSW model of electroweak interactions? **Norman**
2. What are the possible decay modes of a massive photon and what are the corresponding probabilities? Is energy conserved in these decays? **Nick**
3. How are the bounds on photon charge and the mass determined? What are their current values? **Arbin**
4. What are sterile neutrinos? What experiments have been done to detect them? **Cody**
5. How is the comoving distance of the surface of last scattering d_L determined? Is there a standard conversion factor to go to linear distance? What does the corresponding time scale $\frac{m}{E}d_L$ mean? **Shamin**
6. Do we observe photons with different speeds? **Anthony Paul**
7. How do the equations of Special Relativity (for example, $\gamma = \frac{1}{\sqrt{1-(v/c)^2}}$ and $E = mc^2$) change if the photon has mass and charge? How is the Standard Model affected? **Brian**
8. What is the Stückelberg mechanism? **Bijaya**
9. What is a plasma mass? **Mongi**
10. How, if at all, is the effect of time dilation experienced by photons interacting with the gravitational fields of galaxies (which formed *after* the decoupling of matter from radiation) accounted for in analyzing the CMB spectrum? **Linda**