

Physics 416 Quiz Sheet

Quiz 21 Review of Commas, Semicolons, and Colons

Name: _____

In this paragraph, add commas, semicolons and/or colons where they should be, take them out where they do not belong, and leave them alone if correct. Consult quizzes 10 and 11 for a review.

The standard model, a paradigm of particle physics, is a theory of three of the four fundamental interactions, and the elementary particles that take part in these interactions. These particles make up all visible matter in the universe, and they include all matter classified as baryonic. Every high energy physics experiment carried out since the 1950s has eventually yielded findings consistent with the standard model. Still the standard model cannot be a complete theory of fundamental interactions, because it does not include gravitation, dark matter or dark energy. It is not quite a complete description of leptons either; it does not describe nonzero neutrino masses.

The standard model contains fields of spin 1, three of them, spin $\frac{1}{2}$, five of them, and spin 0, only one. The spin 0 field acquires a vacuum expectation value leaving a combination of the weak isospin I_3 and weak hypercharge unbroken. This is the electromagnetic gauge group and the photon remains massless. The standard formula for the electric charge (which defines the normalization of the weak hypercharge Y which would otherwise be somewhat arbitrary) is:

$$Q = I_3 + Y / 2$$