examination of the forces that govern the behaviour of the constituents of nuclei or other strongly interacting particles.

The first experiments on positronium were done in 1951 by Martin Deutsch of MIT. A very large volume of work on positronium has been done between that time and today. This work has resulted in a complete and accurate tabulation of many energy levels of positronium and extremely precise measurements of the transitions between them. Figure 12 shows a diagram of these energy levels and of the numbers which go with them. These numbers constitute one of the most fundamental tests of the validity of quantum electrodynamics. For instance, the transition energy between the two lowest levels of positronium in theory is given by 203·40 GHz with an uncertainty of $\pm 0{\cdot}01$, while the experimental measurements give 203·3870.

This type of spectacular agreement is characteristic of the many experiments that have demonstrated that, as long as only electromagnetic forces are involved, quantum electrodynamics fully explains quantitatively all the observed phenomena.

The most sensitive tests of the validity of quantum electrodynamics at the smallest distances of interaction come from experiments at the highest energies. If electrons and their antiparticles are not bound together as they are in positronium, but rather collide

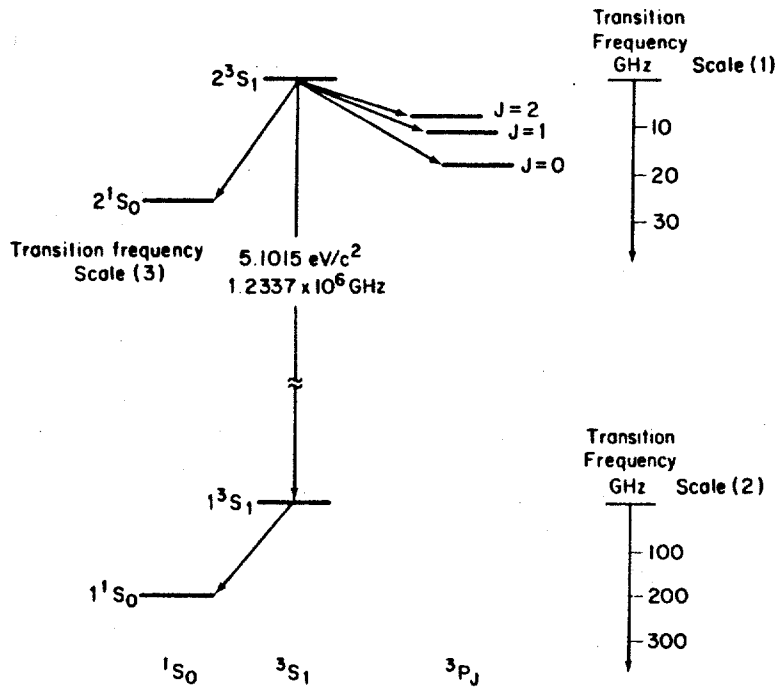

Fig. 12. Energy level spectrum of positronium, using the ordinary spectroscopic term designation giving spin multiplicity, orbital angular momentum and spin angular momentum, respectively. The spectrum is plotted in three different scales: (1) one scale shown in the upper right-hand corner corresponding to the transitions among levels of principal quantum number two; (2) a second scale shown in the lower right-hand corner corresponding to the transition between levels of principal quantum number one; and (3) the transition between the energy levels of principal quantum number 1 and 2 is shown on a still different scale, since it is larger by 5 orders of magnitude than the transitions within each principal quantum number.