

Using Two-Photon decay to test Relativistic Many-Body Theory

Two-photon decay rate:

$$A(\omega_1)d\omega_1 = \varphi(\omega_1)|M(\omega_1)|^2 d\omega_1$$

\Uparrow phase space, etc.

$$M(\omega_1) = \sum_n \frac{\langle f \| H_r(\omega_2) \| n \rangle \langle n \| H_r(\omega_1) \| i \rangle}{E_n - E_i + \hbar \omega_1} + \dots$$

Advantages

- Sensitive test of no-virtual-pair approximation - sum over negative energy states appears in lowest order
- Clean Experiments - coincidence condition provides a unique identification of the process - metastable states are an advantage

Disadvantages

- It is necessary to measure the photon energy distribution (particularly at High-Z).
- Precision measurements of spectral distribution are experimentally challenging.