

Remarks on R-parameter extracted from DB spectrum related to three-photon annihilation

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Three-photon annihilation process results from the self decay of o-Ps but also from annihilation of a free positron and electron with spins parallel. Usually the observation of three photons was a way to detect such processes, but it is not an effective way, because it requires the convergence of the three, and therefore strong sources. Using HPGe and analyzing the energy spectrum of emitted photons is much simpler. In this case, the three-photon annihilation results in a continuous energy spectrum of emitted photons, which is the opposite of the annihilation of two photons. The so called R-parameter, or peak to valley ratio is the commonly use for characterization of this process. There will be presented some critical comments regarding this parameter, which is sensitive not only to the three-photon annihilation but also to the geometry of measurements. Each factor which affects the photon absorption in the sample or in the environments influence the R-parameter value. Then the interpretation of the data makes a risk even in the slow positron beam experiment. Some examples of typical measurements will be given too.

There will be presented the newest version of the SP code developed for extraction of the S-parameter from the annihilation line, in this version the option for determination also R-parameter from the energetic spectrum was added.