P31 | **Optimization of positron-lifetime measurement geometry based on Geant4 simulations**

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Proper choice of measuring geometry and experimental setup of nuclear instrumentation modules and photomultipliers is key element which affects substantial measurement properties: count rate and time resolution. An adequate compromise has to be found, when it comes to geometry of measurement. The optimal geometry using three detector layout is inspected in this paper. During our work, we concentrated on the simulation of XP2020Q photomultipliers and the BaF2 scintillator material. The Geant4 simulation allows to estimate an influence of the measuring geometry on detection efficiency and to choose the most appropriate crystals dimensions and positions. As mentioned in [1], slight changes in geometry result in distortion or improvement of measured results. Experimental results already showed, changes of start crystals dimensions can result in significant increase in count rate of three-detector measurement.

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[1] L.Yu. Dubov, V.I. Grafutin, Yu.V. Funtikov, Yu.V. Shtotsky, L.V. Elnikova, *Optimization of BaF2 positron-lifetime spectrometer geometry based on the Geant4 simulations*, Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, Volume 334, (2014), ISSN 0168-583X