

# Systematics of Positron Lifetime Spectroscopy measurements in ferroelectric crystals

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**Abstract.** In the paper is demonstrated the use of positron lifetime spectroscopy (PLS) in a comparative study of the results in ferroelectrics. The first part is devoted to the application of PLS as a probe for measurements of ferroelectrics. In TGS, RS and KDP at different temperatures and gamma irradiation doses is established the existence of three positron lifetime components. This experimental results show that the second long lifetime component as a function of temperature in order-disorder ferroelectrics TGS, RS and KDS is due to the positron trapping in negatively charge defects of ferroelectric. The positron spectroscopy method is effective for measurements of extremely small defects and voids, which is important for the next exploitation period of the ferroelectrics. PLS measurements of ferroelectrics show that about the third lifetime component is due to the local formation of ortho-positronium state on the boundary between the domains. In the second part the PLS analysis has been applied for examination the electronic and defect structure in selected ferroelectrics materials. In gamma irradiated TGS positrons are trapped in the defect states of the oxygen ions of the two radicals  $\text{CH}_2\text{COO}^-$  and  $\text{NH}_3\text{CHCOO}^-$ . In RS positrons are trapped also in the defect states of the oxygen ions and OH groups.