

THEORY OF PHYSICAL PROPERTIES OF FERRO-
AND ANTIFERROELECTRICS OF THE KH_2PO_4
FAMILY RELATED TO STRAINS u_4 AND u_5

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S u m m a r y

An extension of the proton tunneling model is proposed in order to study piezoelectric, elastic, and dielectric properties of ferro- and antiferroelectrics of the KH_2PO_4 family, which are connected to the shear strains u_4 and u_5 . Expressions for a number of relevant physical characteristics of those crystals in the paraelectric phase are obtained in the four-particle cluster approximation for short-range interactions and in the molecular field approximation for long-range ones. Due to a proper selection of the values for the fitting parameters of the theory, a good agreement between theoretical and experimental results for ferroelectrics KH_2PO_4 and antiferroelectrics $\text{NH}_4\text{H}_2\text{PO}_4$ is achieved.