

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Ferroelectric phase transition in the incommensurate phase of the  $\text{K}_2\text{SeO}_4$  crystal** TIGRAN ASLANYAN, Institute for Physical Research, Armenian National Academy of Sciences — It is shown that in the incommensurate (IC) phase of the  $\text{K}_2\text{SeO}_4$  crystal a phase transition takes place to the ferroelectric IC phase, prior to the lock-in transition to the triple-period commensurate phase. Such a behavior is due to the Lorentz microscopic electric field, which is induced by the IC domains on approaching the lock-in transition temperature. The proposed behavior of the  $\text{K}_2\text{SeO}_4$  crystal explains the second-harmonic generation, observed in the IC phase, near the lock-in transition. It explains also the observed drop in the crystal's elastic constant  $c_{55}$  near the lock-in transition, which corresponds to a significant decrease of the z-polarized sound velocity in the x-direction. Continuous increasing of the polarization in the ferroelectric IC phase manifests itself as a continuous decreasing of the sound velocity. In the same model one can explain also the observation of an overdamped Raman scattering in the  $z(xz)y$  geometry in the low temperature range of the IC phase existence. Dielectric properties of the ferroelectric crystals with artificially fabricated domains are discussed.

Tigran Aslanyan  
Institute for Physical Research, Armenian National Academy of Sciences

Date submitted: 15 Nov 2005

Electronic form version 1.4