On electrical fields in dielectrics caused by temperature gradient

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In this report I have show that the temperature gradient causes the polarization of dielectrics. The effect is a universal one and it should take place in any dielectrics. The physical nature of this phenomenon consists in that the dipole-quadrupole interaction of the atom in a given lattice site with a neighbouring atom induces the dipole momentum of that atom. In the absence of temperature gradient the summation over all neighbours results in zero dipole momentum. Nonzero temperature gradient results in an appearance of the specific direction in the crystal. It causes the anisotropy of the phonon distribution function and nonzero average dipole momentum. The coefficient of proportionality between the polarization vector and the temperature gradient depends on temperature and it is similar to the temperature dependence of the specific heat. Liquid dielectrics, in particular, superfluid systems, should also demonstrate this phenomenon. In superfluids under the propagation of the second sound (temperature waves) the difference of temperatures results in the difference of electrical potentials.

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