**Piezo-electric effect at very low temperatures – a potential thermometry in millikelvin temperature range**

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We investigated the properties of a high Q-value piezoelectric quartz tuning fork in vacuum and millikelvin (mK) temperature range using a pulse-demodulation (P-D) technique. Application of the P-D technique allowed us to excite the standard 32 kHz tuning fork with very low energy of the order of 10 fJ and to measure the resonance frequency of the fork‘s decay signal with resolution better than 10 ppb. We found a continuous and reproducible temperature dependence of the fork's resonance frequency in mK range. Observed dependence suggests a potential application for the piezoelectric quartz tuning forks to be used as thermometers in mK range. We also discuss the physical origin of the observed phenomenon.

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