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Abstract:A new method is proposed for calibration of the terahertz wave spectral brightness. The method is based on the use of quantum and thermal field fluctuations as intrinsic references under nonlinear-optical detection. Both effective brightness of the thermal fluctuations and temperature of the laser-pumped nonlinear-optical crystal can be measured absolutely within the calibration procedure also. It is shown that the accuracy of the terahertz wave brightness calibration is strongly dependent on the value of the terahertz wave losses in the nonlinear-optical crystal. The scheme of quasi-phase matched terahertz wave detection in periodically poled lithium niobate is considered. Dispersion of the absorption coefficient in the terahertz frequency range is measured by a three-frequency interference method under spontaneous parametric down-conversion for nominally pure and Mg-doped lithium niobate crystals. The influence of the terahertz radiation losses in Mg-doped lithium niobate crystals is estimated.