

PHASE-MODULATED PARAMETRIC
ANTI-STOKES STIMULATED RAMAN
SCATTERING OF CHERENKOV-TYPE
IN SELF-FOCUSING AREAS
OF EXCITING RADIATION

*A.I. Ivanisik, O.Iu. Isaienko, P.A. Korotkov,
G.V. Ponezha*

¹Taras Shevchenko National University of Kyiv,
Radiophysics Faculty
(2, *Prosp. Build 4g, Academician Glushkov, Kyiv 03127,
Ukraine; e-mail: aivan@univ.kiev.ua*)

²National Academy of Statistics,
Accounting and Auditing
(1, *Pidhirna Str., Kyiv 04107, Ukraine*)

S u m m a r y

The influence of the speed of the focal point under self-modulation of the phase and self-focusing on the frequency-angular radiation spectra of a parametric stimulated Raman scattering (SRS) anti-Stokes component is considered. The phase self-modulation of both exciting and scattered anti-Stokes radiation is taken into consideration. The creation of broadened anti-Stokes frequency-angular bands is explained. The most intense frequency-angular bands, which are described by relations typical of the Cherenkov radiation, are generated when the speed of the self-focused focal point coincides with the phase velocity of a nonlinear polarization at the anti-Stokes Raman frequency and the phase velocity of a scattered axial radiation. In particular, under the excitation by nanosecond laser pulses, such bands in toluene reach shifts of $\approx -200 \text{ cm}^{-1}$ relatively to the anti-Stokes Raman frequency.