

# Laser, Optics and Photonics

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## Parametric generation in PPLN crystal with pumping by a Q-switched mode locked Nd:YAG laser: Comparison of super luminescent and singly - resonant regimes

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In this paper, we compared two regimes of optical parametric generation (parametric super luminescence and a singly-resonant OPO) in a periodically poled lithium niobate (PPLN) crystal pumped by a train of  $\sim 50$ ps pulses using a Q-switched mode locked Nd:YAG laser. In the super luminescent regime at the average pumping power of the laser of  $\sim 0.5$ W and train repetition rates of 2kHz, the peak total (at the signal  $\sim 1.5\mu\text{m}$  and idler  $\sim 3.82\mu\text{m}$  wavelengths) output power were as high as  $\sim 200$ kW. The total conversion efficiency (with respect to the absorbed power) was  $\sim 83\%$ . To the best of our knowledge, this is the highest efficiency obtained with powerful super luminescent parametric sources. In the considered regimes, the values of the output powers and the generation thresholds at the idle wavelength differed by a factor of 1.5 (the output power

in the regime OPO was higher and the threshold was lower). The pump depletion was  $\sim 50\%$  for both regimes. Divergences at signal and idle wavelengths are measured. New lines in the visible and UV spectrum were observed and are explained

### Speaker Biography

Valery Ilyich Donin received his degrees MSc (Tomsk State University) and PhD (Siberian Branch of the Russian Academy of Sciences SB RAS) and Doctorate in Physics and Maths (SB RAS) in 1963, 1972, and 1989, respectively. He has authored about 130 scientific publication, including 7 invitations. He has been awarded a Medal at the Exhibition of National Economic Achievements (USSR, 1979), the American Medal of Honor and the Twenty-first Century Achievement Award (ABI, 2001). He has been inducted into the 500 Leaders of influence Hall of Fame (ABI, 2002) and the 500 Founders of 21<sup>st</sup> century Honours List (IBC, 2002). He is a member of the Russian Rozhdestvensky Optical Society, the European Optical Society and American Optical Society. His main interests is on physics of CW high-current gas ion lasers.

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