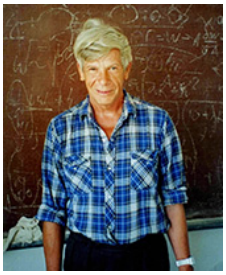

Contribution ID: **89** Type: **Session Talk**

Resonant generation of high-order harmonics in nonlinear electrodynamics

We study theoretical possibility of resonant amplification of electromagnetic modes generated by a nonlinear effect in Euler-Heisenberg electrodynamics. Precisely, we examine the possibility of the amplification for the third harmonics induced by a single electromagnetic mode in radiofrequency cavity, as well as the generation of signal mode of combined frequencies induced by two pump modes ($\omega 1$ and $\omega 2$) in the cavity. To solve the problem, we use two different approaches: first, we solve classical equations of motion obtained from the effective action for signal mode; in second approach we apply pure quantum formalism and calculate the cross-section for the creation of a single quanta of signal mode.
Both approaches have been applied to linear and rectangular cavities. We explicitly show that the third harmonics as well as the mode of combined frequency $2\omega 1 + \omega 2$ are not resonantly amplified while the signal mode with frequency $2\omega 1 - \omega 2$ is amplified for a certain cavity
geometry.

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Session Classification: Section B

Track Classification: Section B: Quantum field theory methods in elementary particle physics