THE EXCITON LUMINESCENSE UNDER EXCESS ELECTRON DRIFT THROUGH CONDENSED RARE GASES

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The intensive VUV emission under excess electrons drift in high ((10^3 V/cm) electric fields through condensed heavy rare gas has been predicted [a] and recently observed [b]. Our analysis [c] revealed the important role of $(Rg^*)^-$ metastable negative ions formation on the electron's energy distribution function and confirmed the possibility to achieve high (10^2) yield of excitons (and VUV photons) per electron. Such avalanches development has been experimentally observed at 77K in three-electrodes cell, where the photocathode-grid gap, filled by Ar gas (10^{17} cm^{-3}), provided the multiplication of seed electrons number via ionization, the Xe crystal was grown between grid and anode, and the seed electrons were created by cathode irradiation by short laser (266 nm) pulse.The same design was used for the realization of effective and powerful UV emission generator in the regime of self-sustained discharge (without laser initiation).

[a] E. B. Gordon, V. V. Khmelenko and O. S. Rzhevsky.*Chem. Phys. Lett.***217**(5,6), 605, 1994.
[b] A. S. Schussler, J. Burghorn, P. Wyder, et al .*Appl. Phys. Lett.* **77**(18),2786, 2000.
[c] E. B. Gordon, A. F. Shestakov.*Low Temp. Phys.*+ **27**(9/10), 883, 2001.