High-Brilliance Ultra-Narrow-Band X-Rays *via* Electron Radiation in Colliding Laser Pulses

Q Z Lv[1], E Raicher[2], C H Keitel[1], and K Z Hatsagortsyan[1]

[1] *Theory Division, Max-Planck-Institut für Kernphysik, Heidelberg, Germany*
[2] *Applied physics department, SOREQ Nuclear Recearch Center, Yavne, Israel*
Contact Email: qingzheng.lyu@mpi-hd.mpg.de

A setup of a unique X-ray source is put forward employing a relativistic electron beam interacting with two counter-propagating laser pulses in the few-photon regime. Contrasted to the Compton scattering (CS) sources, the envisaged X-ray source exhibits extremely narrow relative bandwidth of 10^{-5} to 10^{-4}, comparable to the X-ray free-electron laser (XFEL). The brilliance and flux of the X-ray can be 3 orders of magnitude higher than the CS source, while the angle spreading of the radiation is much smaller. By tuning the laser intensity and the electron energy, one can realize either a single peak or a comb-like X-ray source around keV energy. The laser intensity and the electron energy in the suggested setup are rather moderate, rendering this scheme compact and table-top size, as opposed to XFEL and synchrotron infrastructures.