



Contribution ID: 104

Type: **Poster Presentation**

A project for a Compton photon source at the SKIF synchrotron facility

Tuesday, 10 September 2024 16:00 (1h 30m)

SKIF is a synchrotron radiation facility under construction in Novosibirsk.

Electron beam energy 3 GeV, beam current up to 0.4 A and extremely low horizontal beam emittance 75 pm-rad are convenient to make a high-energy photon source at the main storage ring.

Gamma-photons are obtained using Compton backscattering (inverse Compton scattering) of IR, UV and visible laser radiation.

Using modern high-power lasers, Compton photons in hundreds-MeV energy range and rates up to 300 MHz can be achieved.

Also, higher Compton photon energies (up to 2.6 GeV) can be generated using synchrotron radiation reflected towards the electron beam.

A preferable option for photon monochromatisation is tagging photons by recoil electrons with resolution of 0.6% . . . 0.8% (or ~ 2 MeV), which is an advantage of ultra-low electron emittance.

The discussed Compton source is mainly usable for photonuclear and photohadron processes such as photofission and production of π , η , Δ at nuclei.

Also nonlinear QED, EM detectors calibration and other applications are in interest.

Footnotes

Funding Agency

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Yes

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Session Classification: TUP: Tuesday Poster Session

Track Classification: MC9: Overview and Commissioning