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PS1-17: Hybrid Scheme of Positron Source at SPARC LNF Facility

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The problem of positron beam generation remains of interest during last decade, in connection with the physics of slow positrons, positronium atom beams and with a developing for effective positron source for electron-positron colliders. Several schemes are suggested for intense positron beam generation [1-4], and all of them use the initial intense photon beam generated in the different ways: bremsstrahlung (BS) and coherent bremsstrahlung, channelling radiation (CR), inverse Compton scattering and even undulator radiation. In the most of suggested schemes initial electron beam of several GeV energy is used.

Here we consider the hybrid scheme of the positron source for SPARC LNF facility (Frascati, Italy). The comparison of the positron yield in thin amorphous converter of 0.1 mm thickness produced by the bremsstrahlung and by planar and axial channeling radiation [5] is performed for the positron energy range 1–10 MeV. It is shown that in the case of using the channeling radiation from 200 MeV electrons (parameters SPARC LNF Frascati) in 10 μm W crystal and radiator of 0.1 mm thickness the rate positrons will be 104–105 s⁻¹.

References

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