Muon Source Driven by Channeling Radiation

S.V.Abdrashitov[a,b,1], ***O.V.Bogdanov***[a,b], ***S.B.Dabagov***[c,d,e], ***T.A.Tukhfatullin***[b]

[a] *National Research Tomsk State University, Tomsk, Russia*
[b] *National Research Tomsk Polytechnic University, Tomsk, Russia*
[c] *INFN Laboratori Nazionali di Frascati, Frascati, Italy*
[d] *P.N. Lebedev Physical Institute of the Russian Academy of Sciences, Moscow, Russia*
[e] *National Research Nuclear University MEPhI, Moscow, Russia*

The search for novel muon sources is of growing interest in regards with present actual problems such as, for instance, muon-antimuon colliders [1] and muon-catalyzed nuclear fusion [2]. As known for the muon production one can use interaction of high energy proton beams with carbon based media or beryllium targets [3], as well as interaction of high energy electron beams with laser beams [4].

Many times discussed solution [5] for the positron production is based on the use of multi-GeV electron beam as a source of channeling radiation in a crystalline target (radiator) with its subsequent conversion into electron-positron pairs in amorphous target (convertor).

In this work we propose to apply similar scheme for muon production, i.e. a "hybrid" scheme based on channeling radiation by $1 \div 5$ GeV electrons in W crystalline radiator and its successful conversion in amorphous converter has been analyzed as a source of muons.

References

[1] V.Shiltsev, Modern Physics Letters A **25**, Vol. 08 (2010) 567.
[2] L.Holmlid, Fusion Science and Technology, **75**, Vol. 3 (2019) 208.
[3] J.W.G.Thomason, Nucl. Instrum. Meth. A **917** (2019) 61.
[4] L.Serafini, I.Drebot, A.Bacci et. al. Nucl. Instrum. Meth. A **909** (2018) 309.
[5] R.Chehab, R.Cizeron, C.Sylvia et al 2002 Physics Letters B **525** 41.

[1] Corresponding author: abdsv@tpu.ru