Extremely efficient muon production with a novel pion capture system

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A new muon source, MuSIC, which has very high muon production efficiency, has been constructed at RCNP (Research Center of Nuclear Physics), Osaka University. The MuSIC consists of a rod of graphite as a pion production target and a set of superconducting solenoid magnets; pion capture solenoid and transport solenoid. The first magnet captures the backward pions and muons with 3.5 T solenoidal magnetic field, then they are transported to experimental area thorough the large aperture transport solenoid with 2.0 T. This system can provide up to 10^8/muons using a 392MeV, 1 μA proton beam from the Ring Cyclotron of RCNP. The muon production efficiency is more than 1000 times higher than conventional muon facilities such as PSI and J-PARC MLF-MUSE.

In this presentation, design, status, and prospects of the MuSIC are described as well as applications of the pion capture system.