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EMuS at CSNS-II

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Experimental muon source (EMuS) at China's spallation neutron source (CSNS) is a multidisciplinary project intended mainly for μ SR, muon induced x-ray emission (MIXE) and imaging applications, and secondary for muonium to antimuonium conversion physics or neutrino cross sections measurements. These goals are achieved by intense beams of surface and decay muons produced by pions decaying at rest or in flight respectively, and neutrinos. At EMuS, pions are produced when a target of graphite is interacting with a 25 kW primary proton beam provided from the rapid cycling synchrotron (RCS) of CSNS at phase-II.

Two schemes of EMuS are being studied. The main scheme is called baseline and is operating in surface or decay muons modes and secondary for neutrinos. It is employing a target station with a superconducting capture solenoid and a conical target of graphite for the capture and collection of surface muons or charged pions, a long superconducting line for the transport of surface muons or the decay of charged pions, and shorter beamlines with which extracted surface or decay muons are led to μ SR, MIXE and muon imaging experiments. For the neutrino cross sections measurements, a detector is examined few meters downstream from the end of the long superconducting line. In addition, upstream from the superconducting target station, a vertical μ SR beamline of quadrupoles is foreseen to run in parallel, employing a thin slab of graphite for the production of surface muons with high polarization.

The secondary scheme is called simplified and operating for surface muons and possibly for MIXE experiments. It is employing a conventional rotated thick slab of graphite located sideways from a quadrupole triplet collector, a dipole and a beamline of quadrupoles for the selection and transport of surface muons respectively to μ SR experiments.

In this talk, the different layouts of target stations and beamlines are discussed.

Working group

WG3

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