

Here's a draft outline for the report. The intention is to start by defining the scope of the design – a 0.2 to 50 GeV muon driver for the neutrino factory. We then discuss the fundamental issues for such a machine and justify the selection of SRF technology. The specific SRF/RF issues are then presented, followed by a description of the “existence proof” machine design. We close with a summary of R&D issues and costs.

Design of Muon Accelerator Driver for Neutrino Factory

Summary/Overview/Statement of Work/Scope of Design

Specifies the accelerator at the vehicle taking muons from the source at 0.2 GeV to the neutrino factory storage ring at 50 GeV.

Reviews injected and extracted beam parameters.

Fundamental Issues

Muon Survival

Accelerator Acceptance – longitudinal: capture and acceleration; transverse: momentum acceptance, large emittance

Collective Effects – BBU, other

Selection of Technology

Justification of CW or long pulsed SRF, running on stored energy

Choice of frequency

Use of recirculation – cost optimization; performance (longitudinal management)

SRF Technology Issues

Gradient at low frequency

Q

Selection of CW/long pulsed

Machine Architecture

Use and energy gain of preaccelerator

Transverse optics of preaccelerator

Energy gain/number of passes/longitudinal gymnastics in RLA1 (“compressor”)

Transverse optics of RLA1

Energy gain/number of passes/longitudinal gymnastics in RLA2 (“driver”)

Transverse optics of RLA2

BBU/other collective estimates

R&D Issues

Cavity development – gradient and Q

Quench Protection

Magnetic shielding, esp. in preaccelerator

Costs