

c- τ factory: muon system

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Wiki page: https://ctd.inp.nsk.su/wiki/index.php/Muon_system

Conceptual questions

It is **impossible** to start working on the design of the system without (at least) rough estimation of the physics requirements to the detector. There are **two critical questions** and a number of minor ones.

Conceptual questions (II)

- Major
 - Do we need K_L registration with muon system?
 - What time and space resolutions for the muon track / K_L hit are desired?
- Minor
 - What is desired efficiency for muon reconstruction?
 - Which muon ID fake rate is acceptable?
 - *TBC*

Manpower / resources at LPI

- MEGAGRANT won by LPI team assumes works on c-tau factory muon system R&D
- Close contact to the ITEP people, having huge expertise in scintillator detector production (Vladimir Rusinov)
- Available manpower (*until R&D really starts*):
 - ~2 senior researchers (30-50% of working time)
 - (possible) 1-2 students from MIPT and/or MEPhI (inexperienced)

Proposed responsibility sharing

Moscow team

Novosibirsk team

Choice of the conceptual design

MC simulation of the chosen design option:
toy (standalone) and/or within framework

Development of the software framework for simulation etc

R&D works: scintillator, WLS, SiPM

Mechanical structure design

Production and tests of the detector prototypes

Electronics development, prototypes production and tests

Documentation (TDR etc) preparation

Proposed responsibility sharing (comments)

- There are no **electronics people** at LPI (at least I do not know them).
- Tagir Aushev (MIPT) is interested in participation in the project and have experienced workers.
- There are no experienced **engineers** for mechanical support/frame design at LPI
- There is **no laboratory** for R&D works at LPI, should be created within MEGAGRANT. Part of the unique equipment should be moved from ITEP ('political' troubles) or recreated/bought

Cost estimation

(see wiki page for more details)

Based on Belle II KLM system experience

~**700 USD** per square meter of the detector

including: strips, WLS fiber, SiPMs, other minor materials, labor, packing and transportation

excluding: support frames, cables, connectors, read-out electronics, power supplies, assembly and installation costs

Area (according to drawings of 2010):

$$840\text{m}^2 \text{ (barrel)} + 650\text{m}^2 \text{ (endcap)} = 1490 \text{ m}^2$$

Total: $1490 \times 700 = 1043\text{k USD} = 62\text{M RUB}$

For a rough estimation of excluded items costs we double the total