

EMR Run Plan

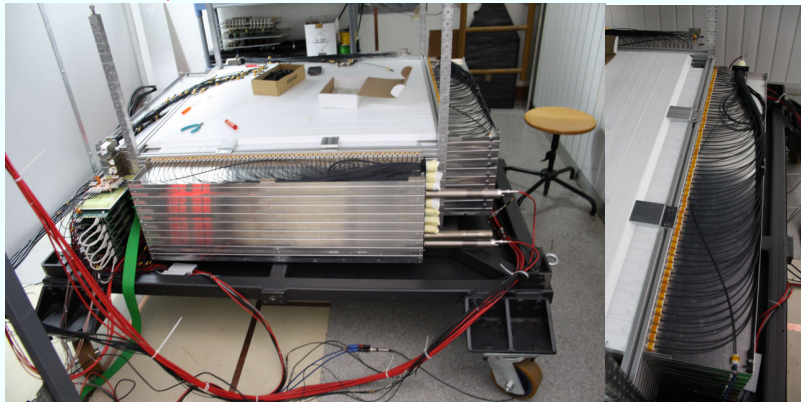
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On Behalf of the EMR Group

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Construction Status

Full detector: 48 planes, 96 fiber bundles



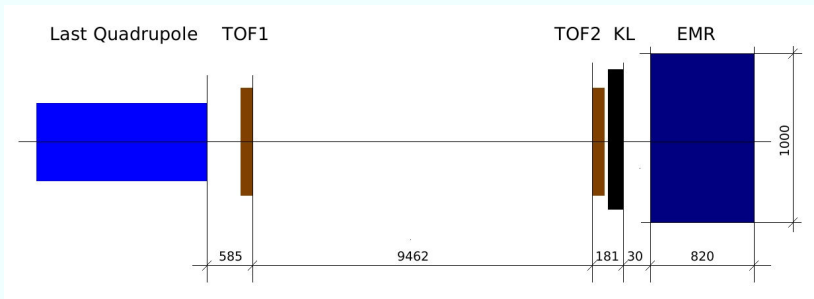
- half of the detector assembled (24 planes)
- 12 fiber bundles ready to assemble 6 more planes
- 36 fiber bundles to be made within two next months

Current Schedule

	month		May				June				July					August				September				October			
	week	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44		
fiber bundle assembly																											
plane assembly																											
packing																											
shipment																											
installation and commissioning																											
cosmic tests																											
DAQ debugging																											
physics runs																											

- it was decided to move EMR run to September/October
- this allows us to complete the detector in Geneva and to have the decay solenoid fully operational
- to estimate rates at EMR, the beamline was simulated with actual geometry

EMR Run Details



- EMR will be installed in its final Step IV position
- muon, pion beam of both polarities will be required
- TOFs must be calibrated
- the beam from the last quads must be as focused as possible
- there is no need to populate the whole detector with hits
- enough (a few thousands) tracks fully contained in the detector is a metric for successful run
- the detector will be calibrated with cosmics prior to the physics run

Beam Requirements and Physics Program

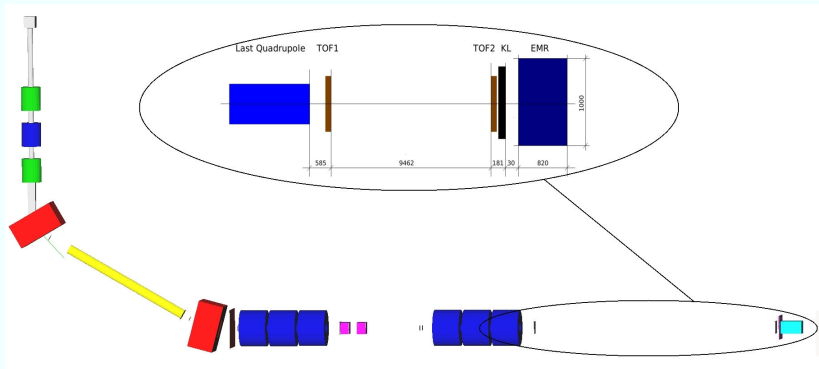
- momentum scan
 - to measure dependence of range on momentum
 - pion beam
 - both polarities
 - momentum up to 400 MeV
- hadronic interaction study
 - to measure properties of nuclear pion capture
 - pion beam
 - both polarities
 - momentum should be set so that pions stop in the middle of the sensitive volume of the detector
- polarization study
 - to measure muon beam polarization
 - muon beam
 - momentum should be set so that muons stop in the middle of the sensitive volume of the detector

In order to estimated required beam time, different beam setting have been simulated

Simulation of the Beam Line

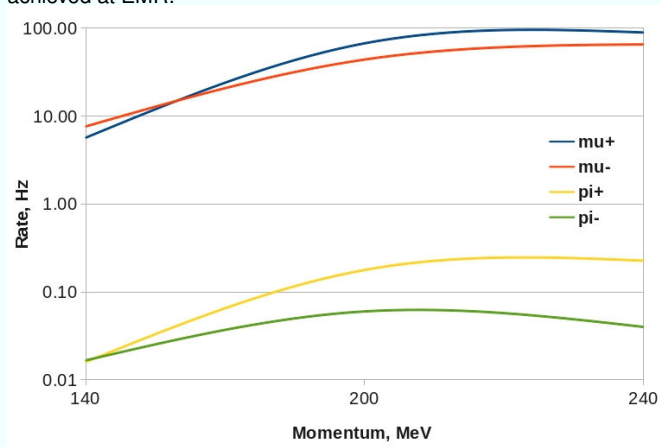
Step IV

- different beam settings have been simulated:
 - emittance: 3,6,10
 - momentum: 140, 200, 240
 - both polarities
 - 6-200 negative beam in opposite polarization
- rates are normalized to 6-200 setting



Particle Rate at EMR

If the rate at TOF1 for 6-200 beam is equal to 200 Hz, then the following rate will be achieved at EMR:



- according to the simulation there are no electrons at EMR
- pion rate - 0.2 Hz at most
- muon rate - 10 to 70 Hz
- to collect enough statistics beam time should be carefully optimized

- two polarizations have been simulated for 6-200 beam
- for the same number of protons on target and 200 Hz at TOF1, the following rate will be achieved at EMR:

polarization	muons	pions	electrons
+1	33.2	0.03	0
-1	86.1	0.40	0

The EMR run plan would be similar to the December 2011 run except that the solenoid reversal should be replaced by the polarization reversal...

Run plan for December

- 1 December 1-2 : 300 MeV/c positive pion beam for TOF calibration.
 - 2 December 3-16 : momentum scan in "pion" beam mode. To be used for studying of the pion contamination in the Muon beam and for CKOV study.
 - 3 December 17-19 : Possible run with reversed polarity of the Decay Solenoid. Need confirm availability of shifters and electrical expert (M. Hughes). Most likely date for this test is December 19.
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- Momenta to be scanned : 97, 112, 127, 148, 168, 195, 222, 258, 294, 320, 341, 360, 388, 423 and 450 MeV/c in D1.
 - The plan is to start with 97 MeV/c and to run till we have 25×10^4 good particles per momentum point.
 - We have to be ready to change the plan in flight.

- EMR is expected to be at RAL in mid-September
- simulation shows that pion and electron particle rates are greatly reduced at EMR
- careful planning of beam time is required to collect enough statistics to cover the physics program
- the physics program includes momentum scan, hadronic interaction and polarization studies
- **the detector promises to be beautiful ⇒ anyone interested in jumping on the adventure?**