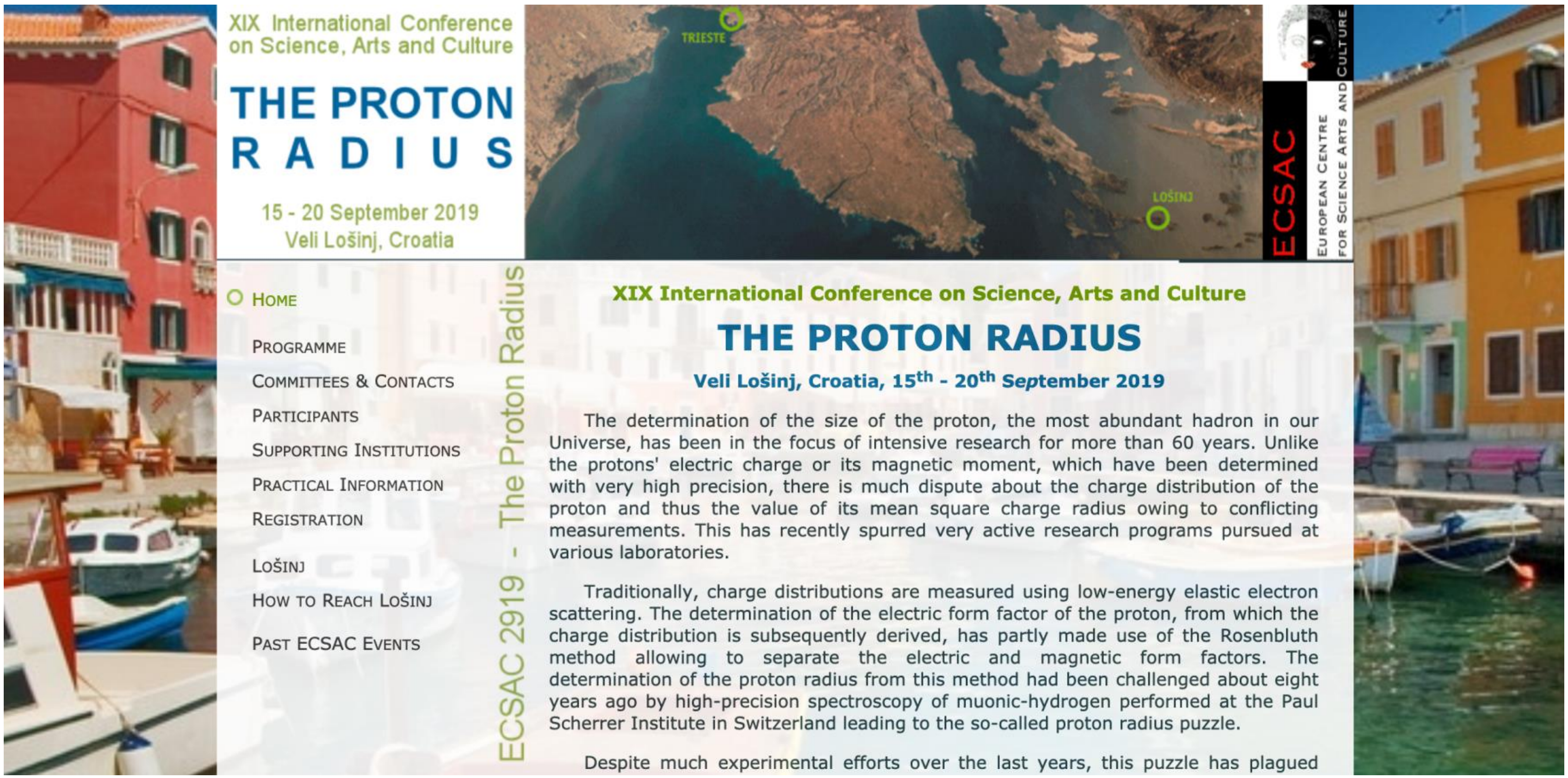
Communications
1.8.2019

- roadmap from the COMPASS++/AMBER Proposal drafting group:
  - July 10: final list of detailed update plans ready (i.e.: which sections of the proposal will be updated by whom and how)
  - August 14: first versions of specific updates ready for discussion
  - September 4: final versions of specific updates ready for insertion into proposal
  - September 18: updated proposal ready for reading by collaboration
  - hand in an update of the Proposal to SPSC (latest end of September)

- our roadmap: decide by „end of July“ on the target region geometry

Next meetings

- follow-up vidyo meeting mid-August or beginning of September?
- workshop at Losinj 19. and/or 20.9. (vidyo for remote attendance), following the conference



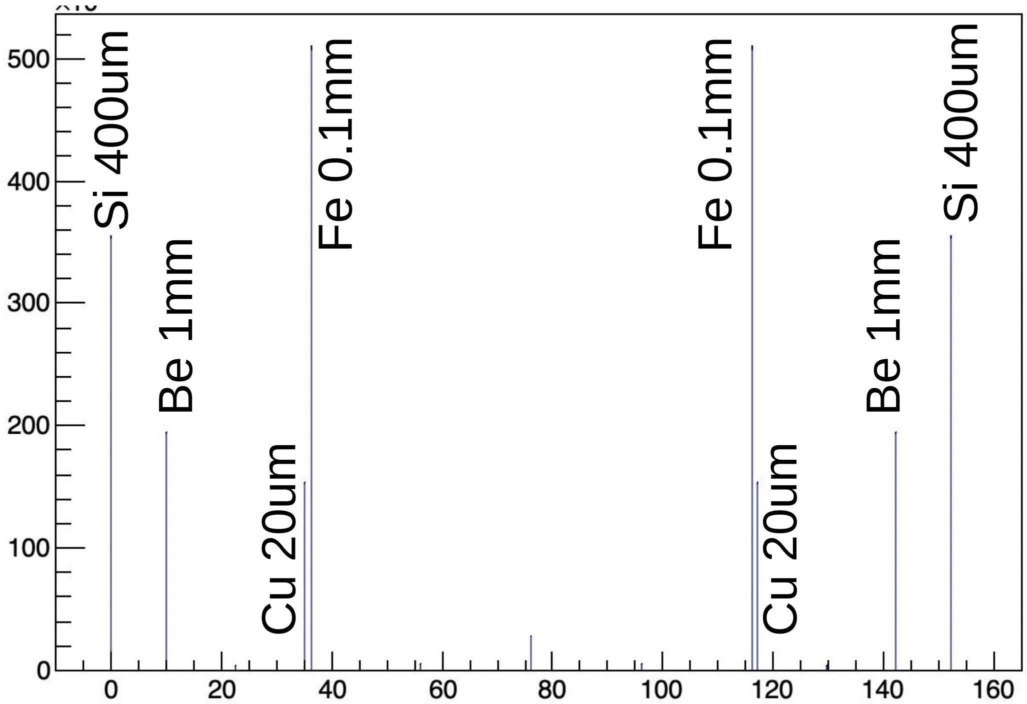
TPC material budget

from Evgeni's email:
The material for inner part of the TPC for the mu-p experiment:

1. Cathode (diameter 600mm): The central circle (for beam) 30 um Aluminum foil (possibly less). Diameter of the central cathode depends on the beam size.
2. The grid (diameter- 600mm): 100 um diameter steel wires in 1 mm stepping.
   that is 20% of the surface / events for each grid! Each wire 0.6% R.L.
3. The Anode (diameter- 600mm): The central circle (for beam).
   80 um Kapton + 20 um copper (possible less).
4. The Be window : The hemisphere with diameter 70 mm and thickness - 1mm.
   The final design of the Be windows depends from the beam size and safety requirements (maximal test pressure ?).

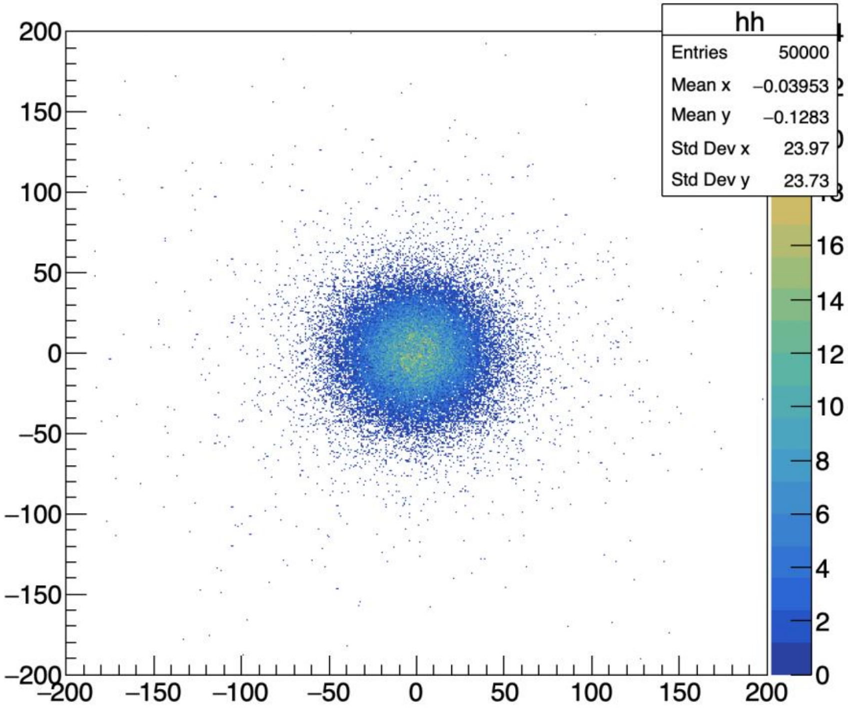
Material budget: where is what

2zones / 150cm Si-Si

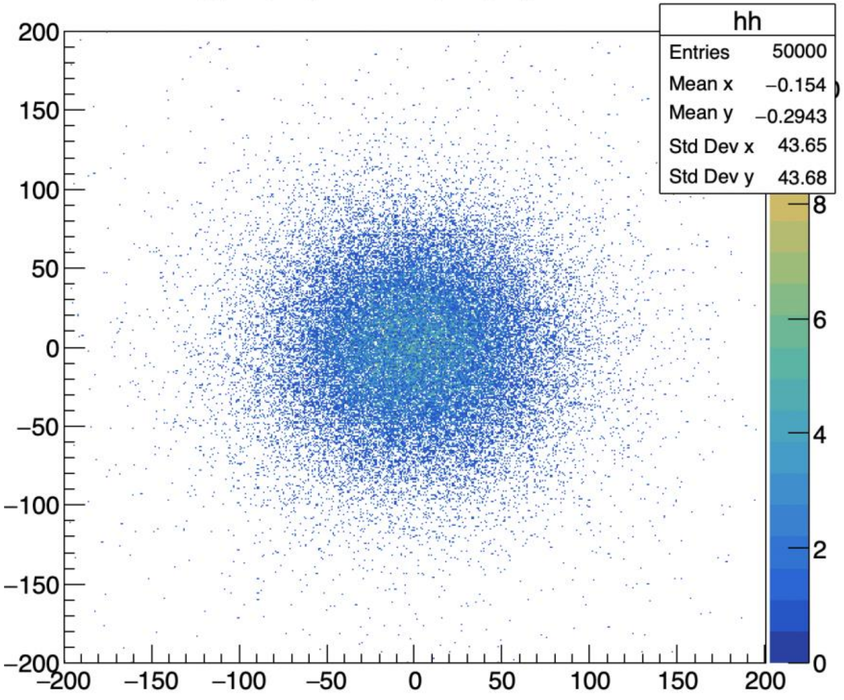


Multiple scattering impact for different target options

2zones / 150cm Si-Si [µm]



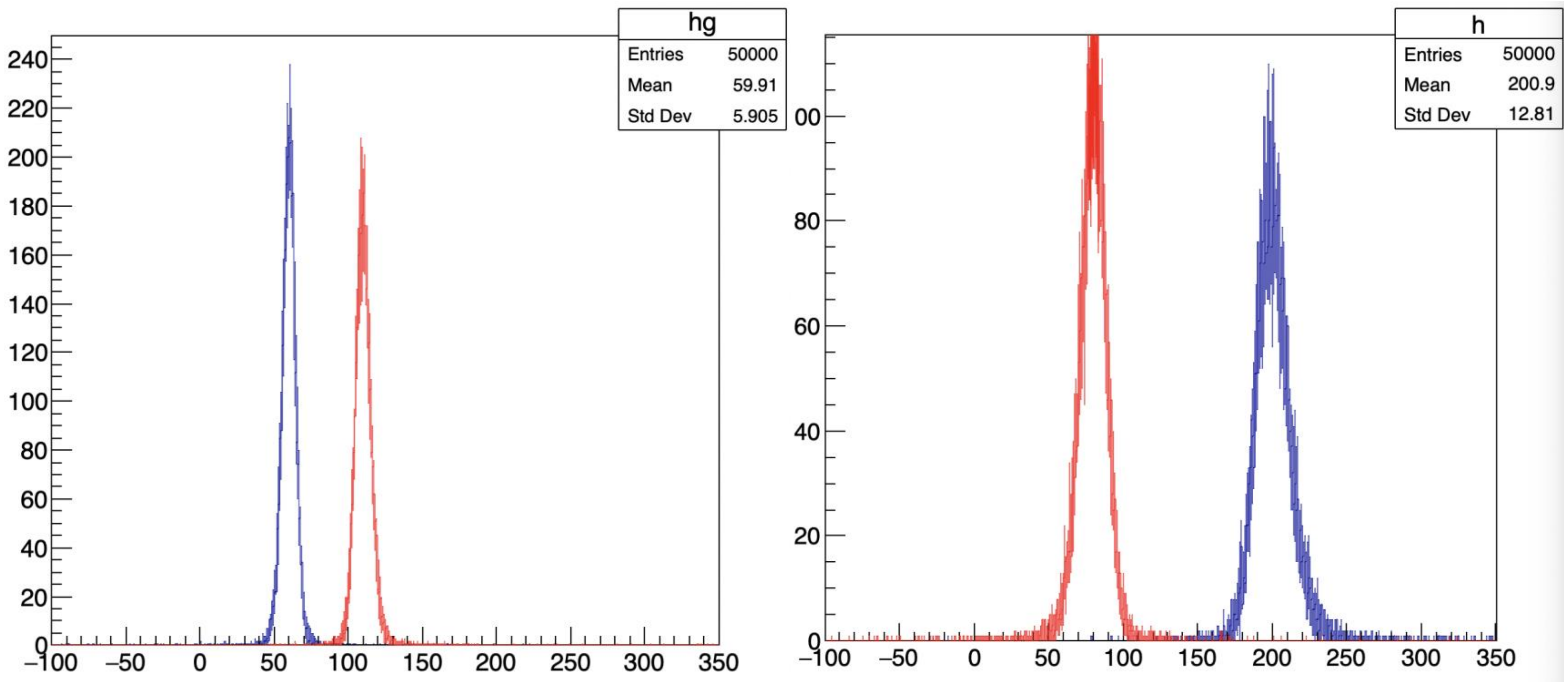
4zones / 240cm Si-Si [µm]



Multiple scattering impact for different target options

reconstruction ideal Si detectors, 300µrad scattering angle

2zones / 150cm Si-Si [cm]　　　4zones / 240cm Si-Si [cm]



Feedback from SPSC preliminary

Here is our feedback from the closed session of the SPSC. The preliminary minutes read:

"The Committee received with interest the Proposal SPSC-P-360 by the COMPASS++/AMBER Collaboration for measurements at the M2 beam line of the CERN SPS in 2022, 2023 and 2024. The Committee will further review the proposal."

There has been a first discussion of the AMBER proposal in the closed session. Given that the document was uploaded only recently, we (the referees) did not have time to look into all the details, so the discussion has been held at a fairly general level. Several questions were raised that we want to convey to you now and more detailed questions will follow in due course.

Regarding the Proton Radius part, the SPSC likes to see some study of the expected systematic errors. At the moment there is no information to support the hope that the systematic errors are under control and at the level required for a 1% determination of the proton radius by AMBER. The committee would also like to see a more detailed account of the differences w.r.t. MUSE and the advantages and disadvantages of using a higher muon energy beam. The comments about the Coulomb distortion of the low-velocity muon wave function in the proposal should for instance be further elaborated on in order for us to assess their importance.

Summary table – beam requirements

Program	Physics Goals	Beam Energy [GeV]	Beam Intensity [s^{-1}]	Trigger Rate [kHz]	Beam Type	Target	Earliest start time, duration	Hardware Additions
μp elastic scattering	Precision proton-radius measurement	100	$4 \cdot 10^6$	100	$\mu^\pm$	high-pr. H2	2022 1 year	active TPC SciFi trigger silicon veto
Hard exclusive reactions	GPD E	160	10^7	10	$\mu^\pm$	$NH_3^\uparrow$	2022 2 years	recoil silicon, modified PT magnet
Input for DMS	$\overline{p}$ production cross-section	20-280	$5 \cdot 10^5$	25	p	LH2, LHe	2022 1 month	LHe target
$\overline{p}$-induced Spectroscopy	Heavy quark exotics	12, 20	$5 \cdot 10^7$	25	$\overline{p}$	LH2	2022 2 years	target spectr.: tracking, calorimetry
Drell-Yan	Pion PDFs	190	$7 \cdot 10^7$	25	$\pi^\pm$	C/W	2022 1-2 years	
Drell-Yan (RF)	Kaon PDFs Nucleon TMDs	~100	10^8	25-50	$K^\pm, \overline{p}$	$NH_3^\uparrow$, C/W	2026 2-3 years	"active absorber", vertex det.
Primakoff (RF)	Kaon polarizi-bility & pion life time	~100	$5 \cdot 10^6$	> 10	K^-	Ni	n/e 2026 1 year	
Prompt Photons (RF)	Meson gluon PDFs	≥ 100	$5 \cdot 10^6$	10-100	$K^\pm$ $\pi^\pm$	LH2, Ni	n/e 2026 1-2 years	hodoscope
K-induced Spectroscopy (RF)	High-precision strange-meson spectrum	50-100	$5 \cdot 10^6$	25	K^-	LH2	2026 1 year	recoil TOF forward PID
Vector mesons (RF)	Spin Density Matrix Elements	50-100	$5 \cdot 10^6$	10-100	$K^\pm, \pi^\pm$	from H to Pb	2026 1 year	

Table 5: Requirements for future programs at the M2 beam line after 2021. Standard muon beams are in blue, standard hadron beams in green, and RF-separated hadron beams in red.