



Status and perspectives of SiMon-s









Both **SiMon and SiMon2 operated efficiently** during n_TOF-Phase3. We recommend to **change as little as possible** for the commissioning, in order to measure the new fluxs with the same set-up.

All the ordinary activities, such as testing the integrity of old detectors and preamplifier, is not mentioned in this presentation.

Activities concerning **SiMon2D has lower priority**, although it is included in the commissioning proposal and we aim to have it ready.

Colors in the next slides indicates mandatory task to be completed before commissioning, upgrade for the near future or improvements ready-made





SiMon

- 1) Fix channel2: one silicon seems very noisy, the source it is not well identified (cables, preamplifier or the silicon itself). Need to locate the problem and replace the component (spares for all components are already at CERN).
- 2) New preamplifier: already at CERN, need to be tested.
- 3) LiF targets: the used sample need to be replaced, one spare is already at CERN (never used). If intact it will be used for the commissioning, a new spare will be made (same size and LiF thickness).
 Work in progress

4) New chamber: the old has vacuum issues (need to investigate if the problem can be solved). A new chamber is at CERN, it needs to be checked for vacuum and the structure to hold the SiMon need to be fixed at its window.



Vacuum checked for both chambers, waiting for exact numbers but they are ok!

at LNS

Simone Amaducci – Italian Meeting - 26 March 2021



Late April by

Simone at CERN

SiMon2

SiMon2 **do not require major modifications** before the commissioning.

1) LiF targets: the old sample can be replaced with the spare if necessary. A new spare will be made with a slightly larger hole to facilitate the alignment (5cm instead of 4.2cm). We are considering reducing the LiF thickness by 25-50% to reduce the pile-up.

Work in progress at LNS

2) Preamplifier inside the chamber: it will be fixed onto the window, we are studying the mechanical support and additional connectors. It is expected to improve the grounding.







LiF target production at LNS (SiMon2)

Fiberglass frames have been prepared at LNS. One large, which serves as support, and three small, on which the mylar has been applied.





Mylar thickness

Mylar thickness and homogeneity has been measured with a three-peak alpha source.









Mylar thickness (Target1)



Point	X (mm)	Y (mm)	dE (keV)	Thickness (µm)
1	0	0	179.24	1.64
2	20	0	181.52	1.66
3	-20	0	173.7	1.59
4	0	20	173.7	1.59
5	0	-20	189.64	1.73
6	15	15	184.03	1.68
7	-15	15	175.02	1.60
8	-15	-15	200.48	1.83
9	15	-15	186.34	1.70
Average thickness (µm)			1.67	
Standard deviation (µm)			0.08	





Mylar thickness (Target2)



Point	X (mm)	Y (mm)	dE (keV)	Thickness (µm)
1	0	0	174.72	1.59
2	20	0	181.31	1.65
3	-20	0	174.00	1.59
4	0	20	173.70	1.59
5	0	-20	181.13	1.65
6	15	15	174.85	1.60
7	-15	15	171.09	1.56
8	-15	-15	175.42	1.60
9	15	-15	177.04	1.62
Average thickness (µm)			1.61	
Standard deviation (µm)			0.03	

Slightly better!



LiF target production at LNS

Lithium fluoride has been deposited by **evaporation** (around 70µm/cm²). The precise thickness value will be measured with the same procedure used for the mylar (in the same coordinates).









LiF thickness (Target1)



Point	X (mm)	Y (mm)	dE (keV)	Thickness LiF(µg/cm²)
1	0	0	232.06	78.12
2	20	0	229.07	70.33
3	-20	0	249.49	112.10
4	0	20	241.28	99.96
5	0	-20	242.35	77.96
6	15	15	232.97	72.39
7	-15	15	230.27	81.72
8	-15	-15	252.61	77.10
9	15	-15	236.54	74.25
Average thickness (µg/cm²)			82.66	
Standard deviation (µg/cm²)			14.00	





LiF thickness (Target2)



Point	X (mm)	Y (mm)	dE (keV)	Thickness LiF(µg/cm²)
1	0	0	230.9	83.09
2	20	0	239.28	85.74
3	-20	0	229.83	82.58
4	0	20	228.47	81.01
5	0	-20	229.44	71.45
6	15	15	232.68	85.53
7	-15	15	230.14	87.34
8	-15	-15	228.7	78.80
9	15	-15	230.32	78.80
Average thickness (µg/cm²)			78.80	
Standard deviation (µg/cm²)			4.84	

Homogeneity of 6%!



LiF thickness (Target1)



Point	X (mm)	Y (mm)	dE (keV)	Thickness LiF(µg/cm²)
1	0	0	232.06	78.12
2	20	0	229.07	70.33
3	-20	0	249.49	112.10
4	0	20	241.28	99.96
5	0	-20	242.35	77.96
6	15	15	232.97	72.39
7	-15	15	230.27	81.72
8	-15	-15	252.61	77.10
9	15	-15	236.54	74.25
Average thickness (µg/cm²)			82.66	
Standard deviation (µg/cm²)			14.00	



LiF thickness (Target1)



	Point	X (mm)	Y (mm)	dE (keV)	Thickness LiF(µg/cm²)	
	1	0	0	232.06	78.12	
	2	20	0	229.07	70.33	
i	3	-20	0	249.49	112.10	
i	4	0	20	241.28	99.96	
1	5	0	-20	242.35	77.96	
	6	15	15	232.97	72.39	
	7	-15	15	230.27	81.72	
	8	-15	-15	252.61	77.10	
	9	15	-15	236.54	74.25	
		Without				
	Average thickness (µg/cm²)		7	5.98		
Standard deviation (µg/cm²)		3	3.89			



LiF target production at LNS (SiMon1)

We have an **aluminum frame ready** but we want to prepare a **second frame made of fiberglass** which ensures a better mechanical stability. The material is ready, we are waiting the electronic lab to cut it.

After that the **same procedure of SiMon2 samples will follow** (including measuring the thickness and homogeneity).





Activities timeline

The LiF depositions will be completed by half April.

I will travel to CERN in the second half of April for testing the detectors and checking if there are problems of any sort.

From June 1st I'm going to be at CERN for the final operations and the commissioning.





SiMon2D

LiF targets: new target with a thinner backing (the older has 1-2 mm or carbon fiber). We are considering to change the mechanical pairing with the detector.



Vacuum chamber: SiMon2D will be placed in vacuum instead of air.



