

RADIATE

Radiation Damage In Accelerator Target Environments
5th Collaboration Meeting
17 > 21 December 2018
CERN, Switzerland

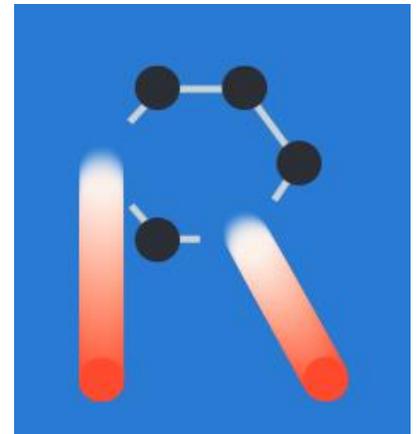
Welcome address

5th RaDIATE Collaboration Meeting

M. Calviani (CERN)



ENGINEERING
DEPARTMENT





WELCOME

To CERN

RADIATE

Radiation Damage In Accelerator Target Environments
5th Collaboration Meeting

RaDIATE 2018 Collaboration Meeting

- RaDIATE kick-off in November 2012 (remote)
- 1st Collaboration Meeting at FNAL (May 2014)
- 2nd Collaboration Meeting in Oxford (May 2015)
- 3rd Collaboration Meeting at PNNL (September 2016)
- 4th Collaboration Meeting at JPARC (September 2017)
- **5th Collaboration Meeting at CERN (December 2018)**

The background of the slide is a dark blue, almost black, space filled with numerous small, bright blue and cyan particles. These particles are arranged in several distinct, glowing circular or semi-circular tracks that spiral inward, resembling particle paths in a detector or a microscopic view of a material. The tracks are more densely packed in some areas, creating a sense of depth and movement.

Introduction to CERN

What's the meaning of CERN?

Conseil
Européen pour la
Recherche
Nucléaire



1952-53

What's the meaning of CERN?

European
Organization for
Nuclear
Research



1954

An abstract visualization of particle tracks in shades of blue and cyan against a dark background. The tracks are composed of numerous small, bright points that form curved, glowing paths, suggesting the movement of particles in a detector or a simulation. The overall effect is dynamic and scientific.

CERN numbers

CERN Member States



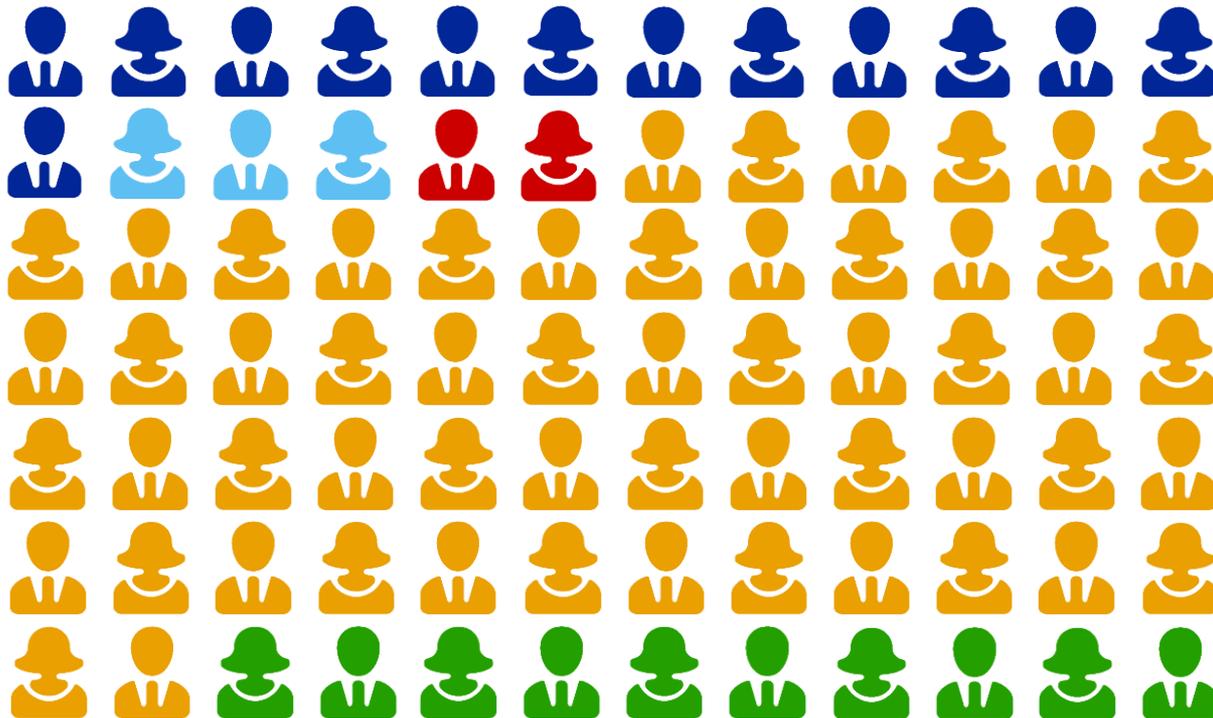
~1 GCHF/y



Germany		20.52%	
United Kingdom		14.65%	
France		14.61%	
Italy		11.04%	
Spain		7.61%	
Netherlands		4.74%	
Switzerland		4.03%	
Norway		2.91%	
Poland		2.81%	
Sweden		2.78%	
Belgium		2.74%	
Austria		2.20%	
Denmark		1.75%	
Finland		1.37%	
Israel		1.42%	
Greece		1.32%	
Portugal		1.14%	
Czech Republic		0.98%	
Romania		0.98%	
Hungary		0.61%	
Slovakia		0.49%	
Bulgaria		0.29%	

CERN people

=+15'000



2'500 staff

600 fellows & apprentices

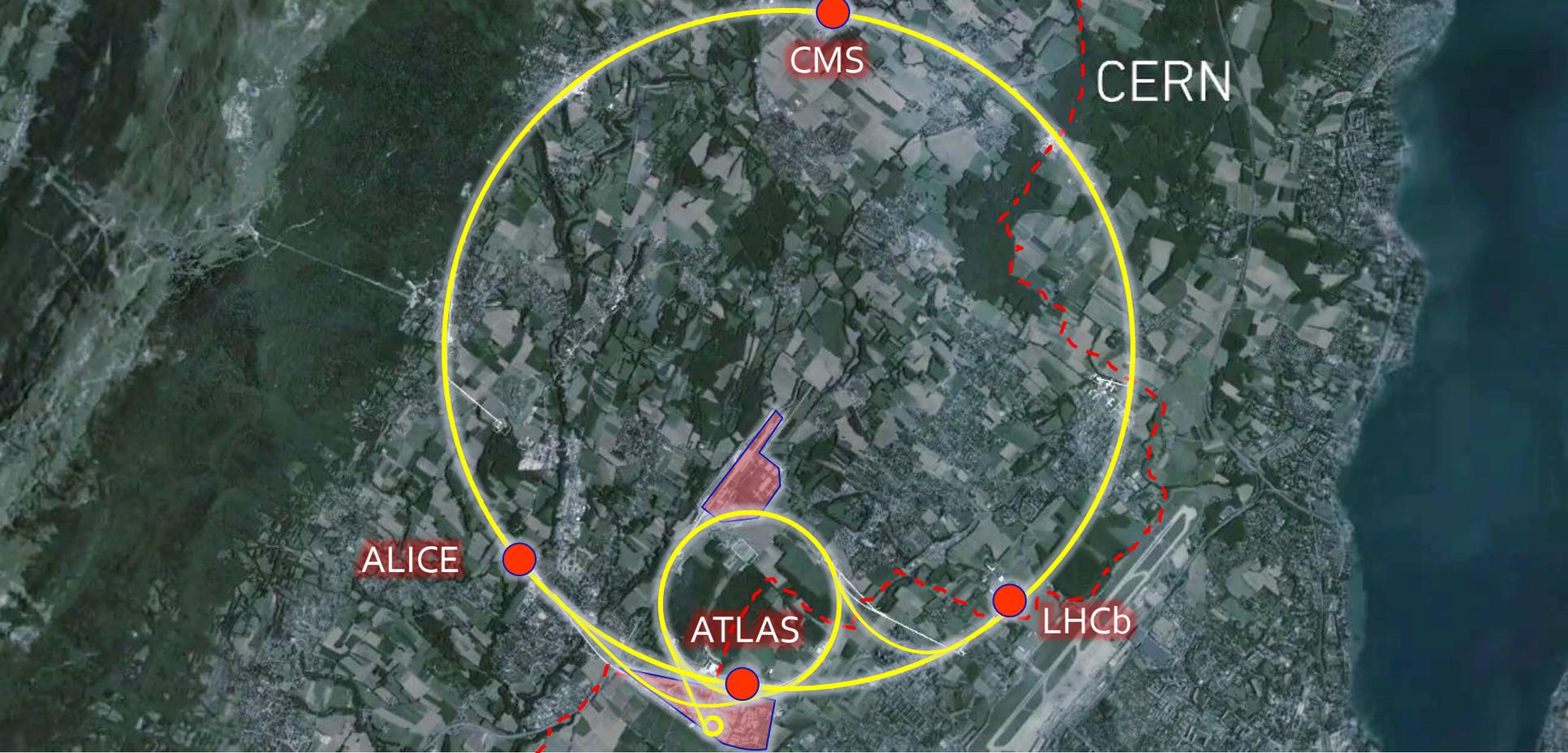
500 students

11'000 users

2'000 external companies

CERN accelerator chain

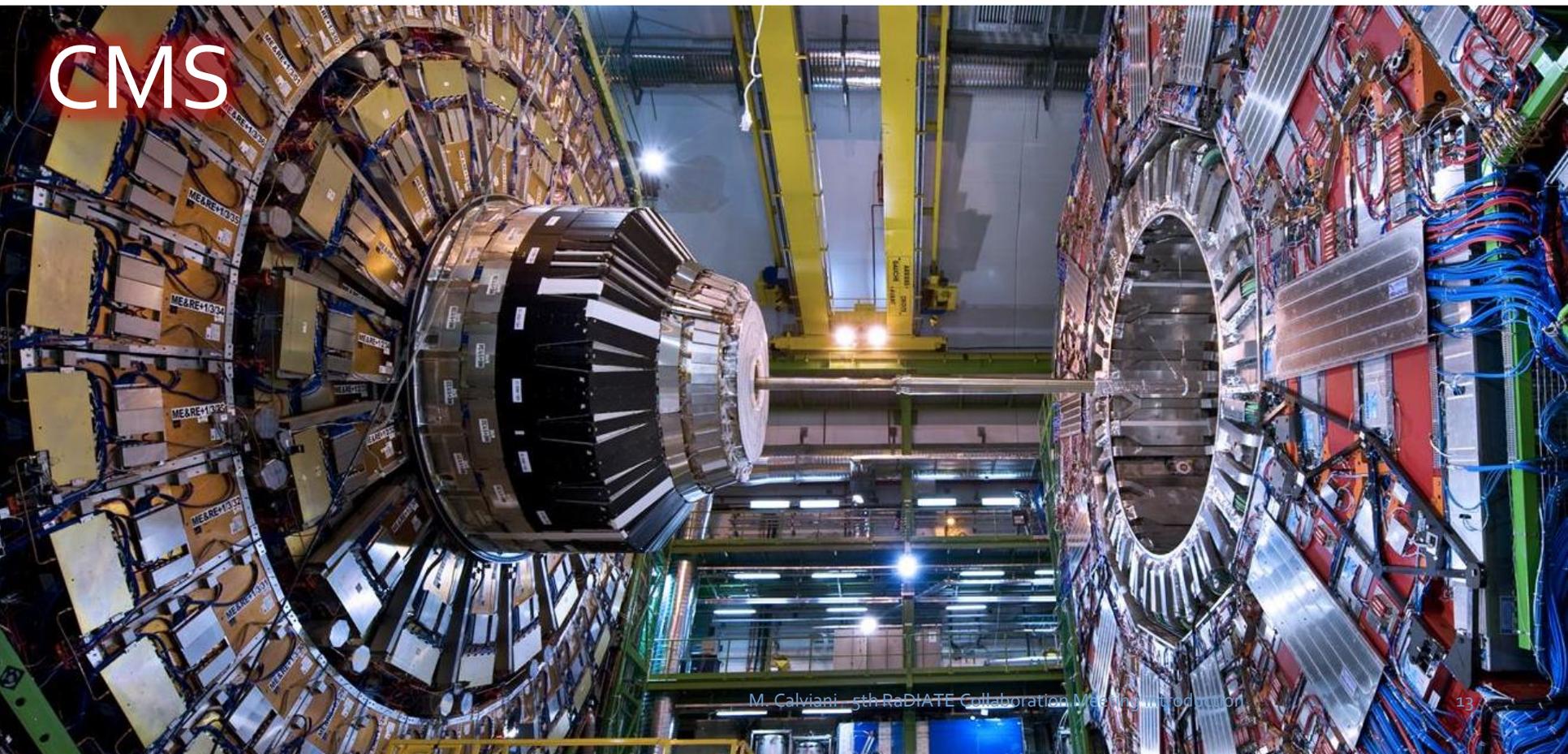




CERN's accelerator chain towards the LHC



CMS



Fixed Target Experiments (PS/SPS)

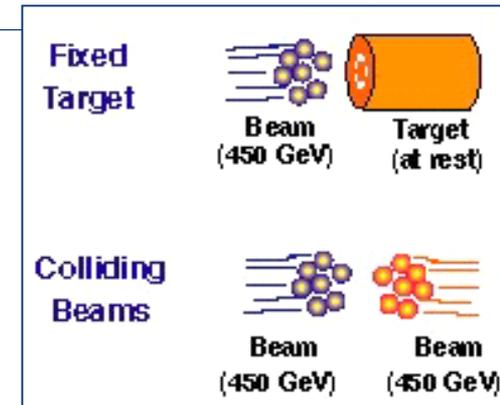
Colliders address the high-energy frontier:

$$E_{\text{CMS}} \sim E_{\text{beam}}$$

Fixed target address high-intensity frontier:

$$E_{\text{CMS}} \sim \sqrt{E_{\text{beam}}}$$

Fixed target experiments use many more protons than LHC!



$$E_{\text{cms}} \sim \sqrt{E_{\text{beam}}}$$

e.g.: SPS: 27 GeV

Many particle types:
e.g. p , π , K , e , μ , ..

Precision experiments,
Rare events

$$E_{\text{cms}} \sim E_{\text{beam}}$$

e.g.: LHC: 13000 GeV

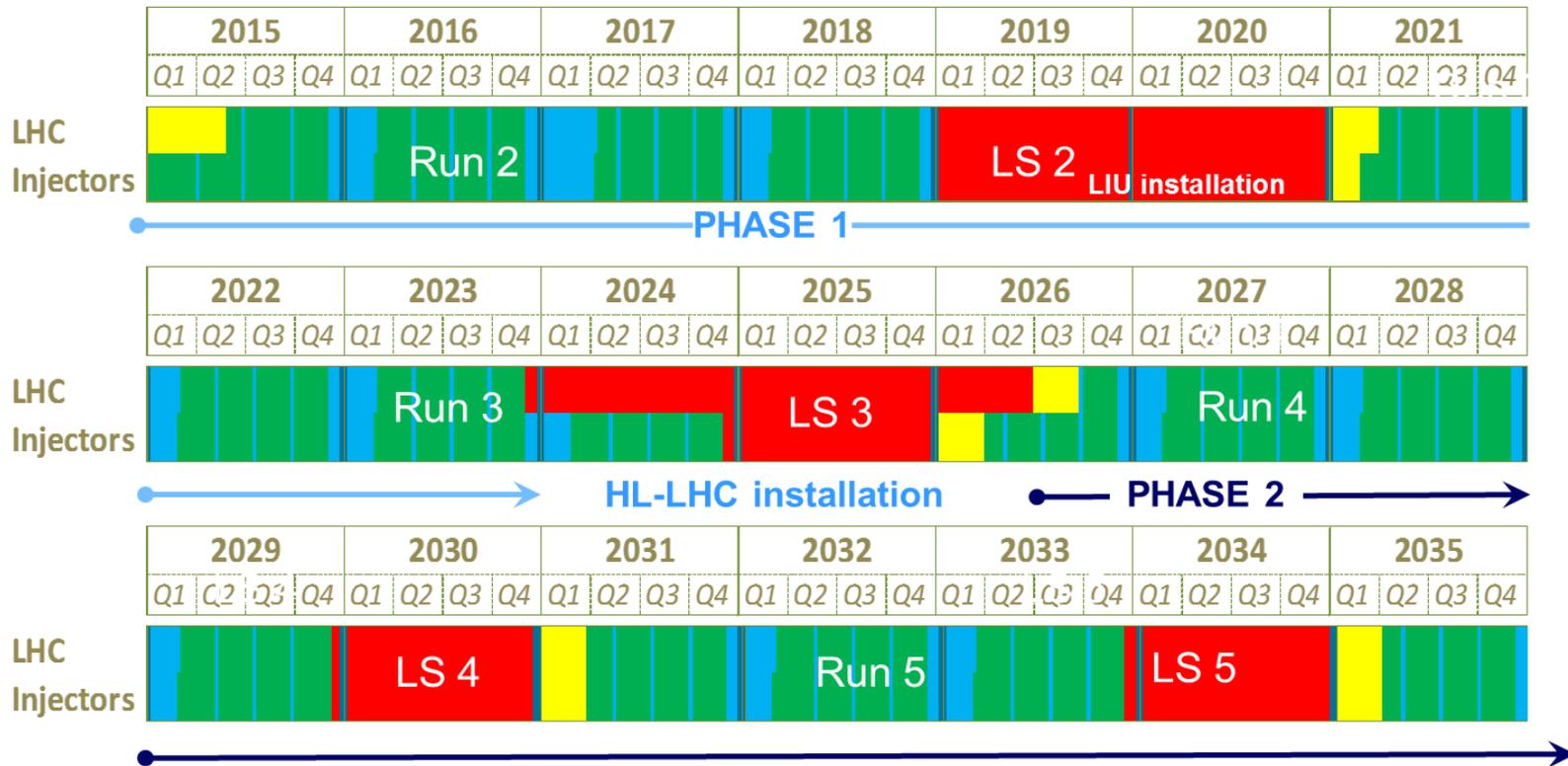
One particle type:
Protons (evtl ions)

Discovery machines,
e.g. Higgs

Longer term perspective

LHC roadmap: according to MTP 2016-2020 V1

LS2 starting in 2019 => 24 months + 3 months BC
 LS3 LHC: starting in 2024 => 30 months + 3 months BC
 Injectors: in 2025 => 13 months + 3 months BC



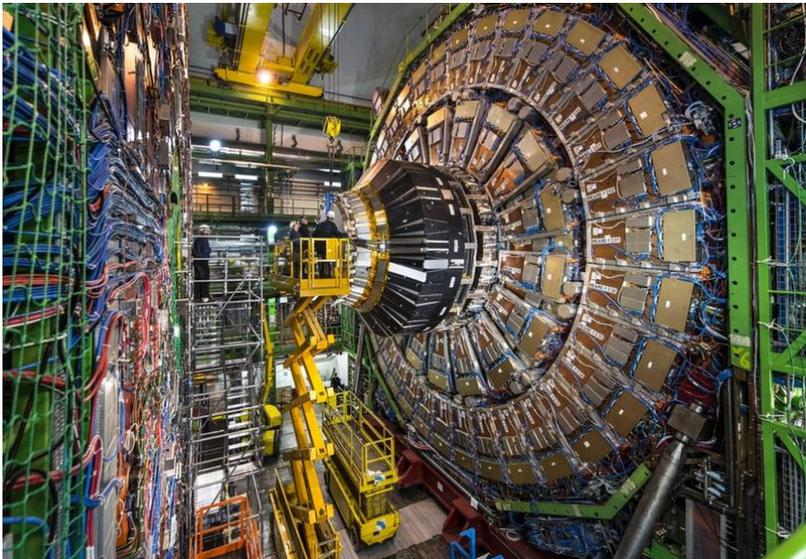
... back to RaDIATE Meeting

Orientation map



Visits logistics (I/II) – Monday 17th

- Visit **Compact Muon Solenoid (CMS)** experimental cavern underground on Monday 17th in the afternoon
- Followed by a visit to **SM18**, a multipurpose technological building with LHC magnets, cryogenics and a multitude of high-tech equipment



Visits logistics (II/II)

- All visitors must carry their identity card or passport, valid for entry into both France and Switzerland.
- **All visitors will be requested to wear a CERN visitor card while on CERN premises**



CERN does not allow luggage in guided tours or exhibitions. No luggage storage facility is available.



High-heeled shoes, open-toed shoes, flip-flops and sandals are not permitted.



Smoking is not allowed anywhere at CERN.



Pets are not allowed anywhere at CERN.

SOCIAL EVENTS & VISITS

Monday, 17 December

CMS & SM18 visits

1:00 p.m.: Shuttle from building 39 to CMS

1:30 p.m.: CMS visit

3:00 p.m.: Shuttle from CMS to SM18

3:20 p.m.: SM18 visit

4:20 p.m.: Shuttle from SM18 to building 39

Your access card is mandatory!

Coffees, lunch, etc. etc.

- Coffee breaks will be served morning and afternoon
- **Sandwich lunch on Monday 17th** offered by CERN in front of the meeting room
- A **workshop “introduction” buffet dinner** offered by CERN will be served at CERN’s glass-box of Restaurant 1 (floor below) on **Tuesday 18th**

12:25 p.m.: **RaDIATE collaboration group photo**

7:20 p.m.: **Buffet Dinner** - Glass Box, Restaurant N°1

Social events

- Wednesday 19th in the afternoon
 - Visit to the [Red Cross Museum](#) in the UN area
 - Followed by a social dinner at [Restaurant Les Armures](#), in the Geneva Old Town, with a typical Swiss dinner (raclette / fondue)
 - A bus will be available for transport



SOCIAL EVENTS & VISITS

Wednesday, 19 December

Red Cross Museum Visit & Dinner at Restaurant *Les Armures*

2:30 p.m.: Shuttle from building 39 to Red Cross Museum -

3:00 p.m.: **Red Cross Museum visit**

(1 franc or 1 euro for the cloakroom, returned at the end of the visit)

5:00 p.m.: Shuttle from Red Cross Museum to Old Town

5:30 p.m.: **Walk in the Old Town**

7:00 p.m.: **Dinner at Les Armures** – Rue du Soleil Levant, 1204 Geneva

9:30 p.m.: Shuttle from Les Bastions to CERN, building 39

Please confirm the participation to the dinner on Wed
19th by Monday 17th lunchtime to Sylvia

Participants for dinner at *Les Armures*

- CERN

- C. Accettura, C. Bahamonde-Castro, A. Bertarelli, M. Calviani, E. Fornasiere, F. Harden, Y. Kadi, E. Lopez Sola, J. Maestre Heredia, A. Perillo, C. Torregrosa

- Non-CERN

- K. Ammigan, Y. Dai, C. Densham, A. Gottberg, P. Hurh, T. Ishida, Y. Joong Lee, A. Kareer, D. Kim, V. Kuksenko, S. Meigo, N. Nakazato, M. Parkin, F. Pellemoine, D. Senior, N. Simos, T. Spina, I. Szlufarska, R. Webb

Next in-person CM

- Hosting of the **6th RaDIATE Collaboration Meeting in 2019** should be announced at this meeting
- Possibly also for the **7th CM** during 2020
- Please contact me or Patrick during the workshop in case of interest



ENGINEERING
DEPARTMENT

Enjoy the workshop and don't
hesitate to contact me or Sylvia for
any questions