

# Instrumentation

CALIFES ideal for tests and development that requires **frequent access** to test setup.

CERN BI members already using CALIFES and want to continue.

*Required* for LHC ? cost of an R&D facility weighted against LHC beam time required to address instrumentation issues

External collaborators (Oslo and RHUL) presented on-going R&D in CALIFES as well, with clear statement to continue tests beyond 2016.

Instrumentation test stands already exist in CALIFES. **Desire to continue several activities in 2017**. This would be possible without significant facility modifications.

## **Longer term upgrade wishes:**

- \* magnetic chicane (or dogleg?) for variable bunch compression and SR studies

  - **specific requirements on bunch length?**

- \* in-air test area

**Time line 2017+ ?**

# Impedances

Some types of impedances are challenging to estimate with either bench measurements or numerical simulations; wire scanner components is one example.

CLIC structure wakefield mapping in FACET two-bunch experiments shows power of direct wakefield mapping.

Whether CALIFES parameters, like bunch length and time structure, can be used for impedance measurements is application dependent.

2017: wire scanner

Longer term upgrade wishes:

\* a second, independent, injector would allow direct measurement of wake fields for a much broader range of parameters

Time line: concrete proposal for beyond 2017 and WS measurement?

# RADIATION TESTS

CALIFES : peak energy of 200 MeV is not available at other radiation test facilities.

Interesting for the ESA Juice mission..

CALIFES: large intensity range.

A radiation test facility, VESPER, is already in place. Desire to continue tests in VESPER beyond 2017. Beam parameters tuned to the required values: low current dark current beam, expanded to order  $\text{cm}^2$ .

General statement of interest from CERN/EP (no concrete proposals).

2017: Continue tests in VESPER

Longer term, any hardware upgrade wishes: ?

Time line / proposals beyond 2017?

# Light source R&D

X-band FEL collaboration ("Compact-Light") : H2020 proposal being prepared, would include a CALIFES part: X-band component testing (linearizers, deflectors). If funded, this project could be backbone of CALIFES X-band research.

Interest for X-band FEL partners to CALIFES tests also if H2020 proposal is not funded?

CLARA interesting in joining X-band tests (linearizers, deflectors) in order to prepare for an eventual X-band linac at CLARA and help take decision on UK FEL frequency.

**2017** : desired to continue some X-band tests, incl. WFM (see next slide as well)

**2018** -> : seems to be the realistic timeline for rerouting/moving XBOX (RF power for testing of X-band components) ?

THz generation schemes : interest from PSI to follow up with CALIFES ?

# High gradient research

## **2017:**

- \* Ongoing CLIC activities that can be done w/o X-band RF, including WFMs (not gone through here in detail)
- \* Dosimetry experiments for electron radiotherapy, with 200 MeV (eve 2016)

## **2018 (requires X-band RF) :**

- \* Continue kick measurements, alignment studies and ion studies
- \* Dog-leg: important for CLIC to continue, beam loading experiments X-band RF required

# THz

Two main topics/groups :

**1) INFN:** Generation, characterization and eventual science use of THz radiation

**2017 :** THz generation and some characterization can be done almost parasitically (foil in beam)

**2018 -> :** improved parameters (bunch length, charge). Experiments using THz for acceleration

**2) Cockroft:** Comprehensive Dielectric and THz experimental program.

- 3-5 years

- significant manpower contributions (staff, postdocs, PhDs, part time or even FULL time at CERN)

- hardware contributions, including diagnostics useful for the facility as such

- requires significant amount of beam time to be worthwhile (2-3 months / year?)

Would be useful to have an idea, perhaps a concrete example of how the schedule and manpower for DATA@CALIFES, in the summary.

# PWFA

## **2017:**

Discharge plasma source technology ready for beam from mid 2017. Will be first time this type of source will be tested with beam; important/high impact for plasma community and AWAKE.

Space and integration requirements (vacuum leaks, vacuum requirements) required for a large plasma source in CALIFES?

Plasma lens lattice tests ready for beam mid 2017. Experimental demonstration of achromatic interstage design.

Cockroft: interested testing hardware as well

**2018 ->** : plasma source with experiments, including emittance growth.

A second injector would make CALIFES a stronger program (no other facilities have two independent conventional electron guns).

# EDUCATION AND TRAINING

## CALIFES ideal for education and training:

- safe machine (students cannot to any damage)
- complex enough to be interesting (large range of beam parameters) simple enough to learn to operate in a few days
- easy access to machine and gallery

Dedicated training days for targeted groups like JUAS possible and desired, for order of a week of beam time.

For external groups coming to CALIFES for research, e.g. DATA: important that CALIFES preserves academic work environment where students are allowed to help in operation and learn in the process, without strict time pressure (training by doing).

Training network idea: probably to close to hand in EU proposal for Jan 2017; need to establish science case first. However, **would be great if the session leader could help outline ideas for a path towards an ITN in the summary.**



Finally, I join in today's homage from Restaurant 1 :

EPHEMERIE

mercredi  
**12**  
Octobre

Aujourd'hui,  
mercredi,  
nous fêtons  
les Wilfrid

novae  
RESTAURATION