



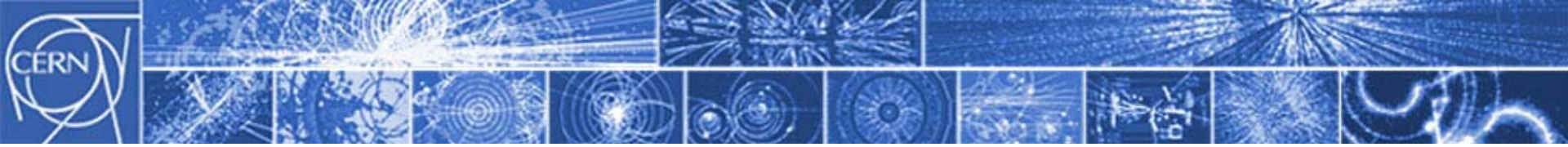
CERN

European Organization for Nuclear Research
Organisation Européenne pour la Recherche Nucléaire

SPL

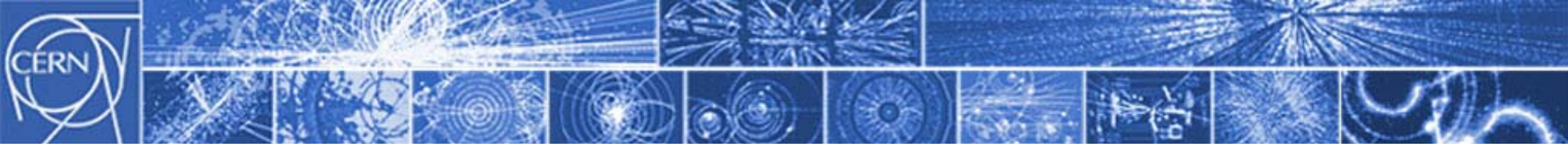
- Status and plans -

**2nd SPL Collaboration Meeting
8-9 May, 2009 - Vancouver**



OUTLINE

1. CERN context
2. SPL progress since December 2008:
 - Organization of the SPL study
 - Access to documentation and meetings
 - Planning
 - Resources
 - Technics
3. Work Plan of the SPL Study

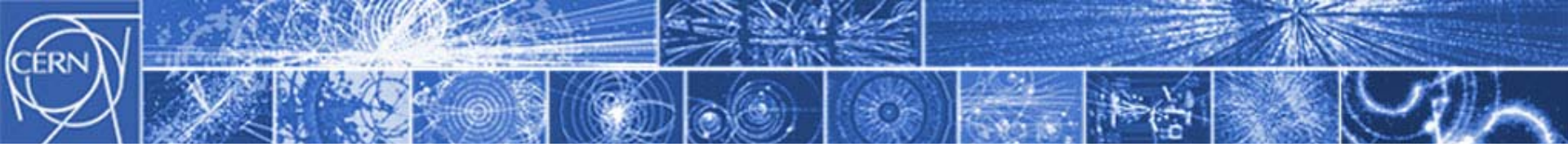


1. CERN context (1/2)

- **New DG (R. Heuer)**
- **New management structure implemented in January 2009 (Director for Accelerators: S. Myers + sLHC project office: L. Evans)**
- **Extensive effort to repair & upgrade the LHC**
[CERN Bulletin \(27/04/2009\)](#): “The 39th and final repaired dipole magnet was lowered into Sector 3-4 and installed on Thursday 16 April. This is the last of the LHC’s easily recognizable 15-metre-long blue superconducting dipoles required for the 3-4 repair. Only two more Short Straight Sections (SSS) remain to be installed in 3-4...”



Mobilization of resources ... Delay for other activities



1. CERN context (2/2)

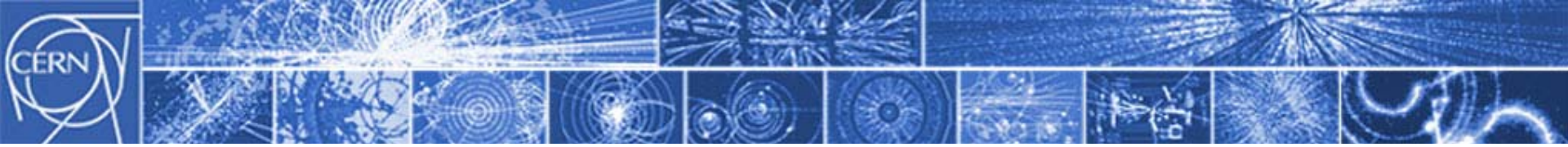
➤ **Review of the CERN scientific strategy:**

[CERN Bulletin \(27/04/2009\)](#): “There’s more to CERN than the LHC, and there’s more to particle physics than CERN. This has always been true, but with the LHC on the verge of collecting its first data, now is the right time to consider carefully what that means for us.

In a couple of weeks’ time, we’ll be hosting a workshop to identify new opportunities in the physics landscape at CERN. As well as embarking upon the LHC research programme, we’re also building up new infrastructure for the future. This has already begun with the civil engineering for Linac 4, and will hopefully continue with a new superconducting proton linac, SPL, and proton synchrotron, PS2, to replace the existing Booster and PS. Will such machines simply serve as an injector for the LHC, or could they support their own research programmes?...” – **R. Heuer**

➤ **Workshop on “New Opportunities in the Physics Landscape at CERN”**
10 - 13, May 2009 at CERN <http://indico.cern.ch/conferenceDisplay.py?confId=51128>

➤ **Workshop on neutrino physics on 1 – 3, October 2009 at CERN**



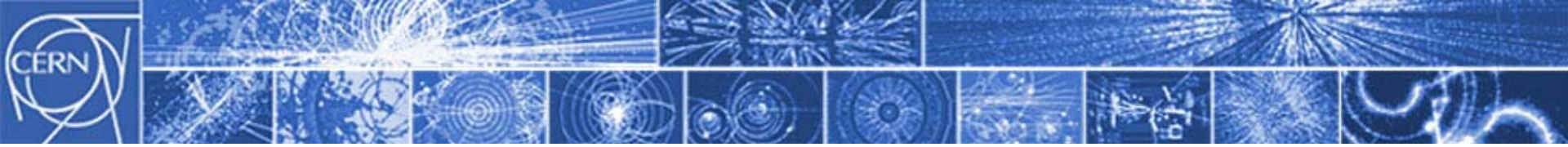
2. SPL progress since December 2008 (1/6)

- **SPL (leader: R. Garoby) is part of the sLHC project (leader: L. Evans)**
Administrative assistant: C. Noels (Cecile.Noels@cern.ch)
- **Organization of the SPL Study inside CERN**

**Working Groups
matched with the
SPL collaboration**

	Coordinator
RF hardware (low level & high power)	E. Ciapala
Cavities (structures & auxiliary equipment)	W. Weingarten
Cryomodule (cryostat & cryogenics)	V. Parma
Beam dynamics (beam parameters)	A. Lombardi
Architecture (layout & geometry, extraction, transfer)	F. Gerigk
Surface treatment and vacuum	S. Calatroni
Integration* (interface with Civil Engineering and all services)	S. Weisz
Safety* (safety file, INB procedures)	???
Linac4	M. Vretenar

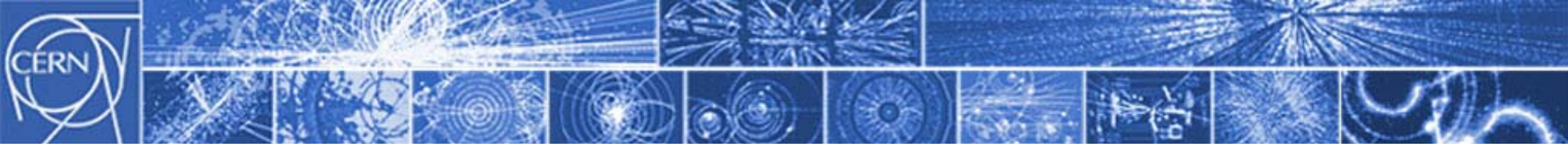
* For all accelerators



2. SPL progress since December 2008 (2/6)

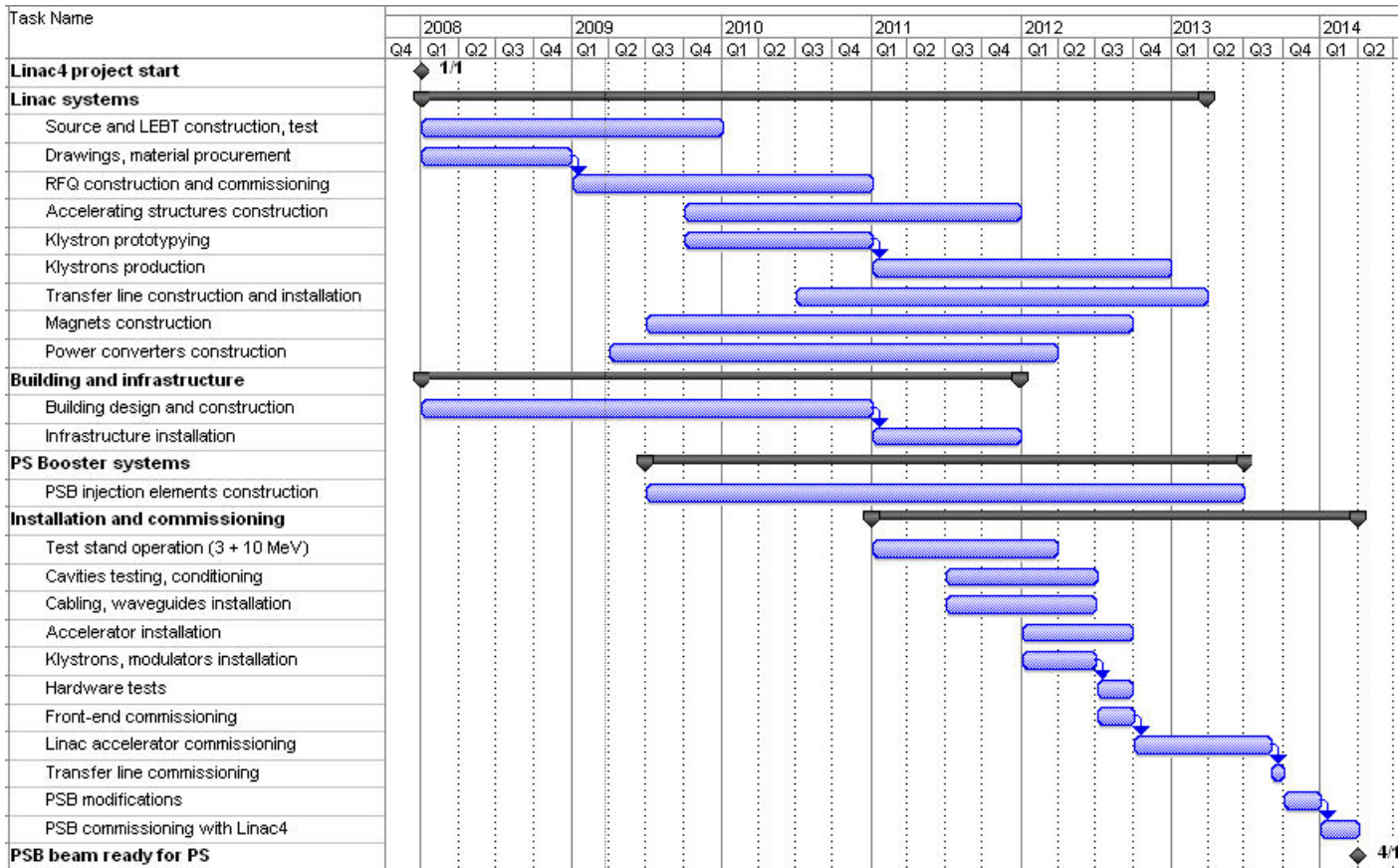
Access to documentation and meetings

- [sLHC Web site](#) (work in progress...)
- New series for sLHC reports and project notes on the [CERN Document Server](#)
- Structured storage for all [SPL documentation](#) in EDMS
- Structured filing of all [SPL meetings](#) in Indico

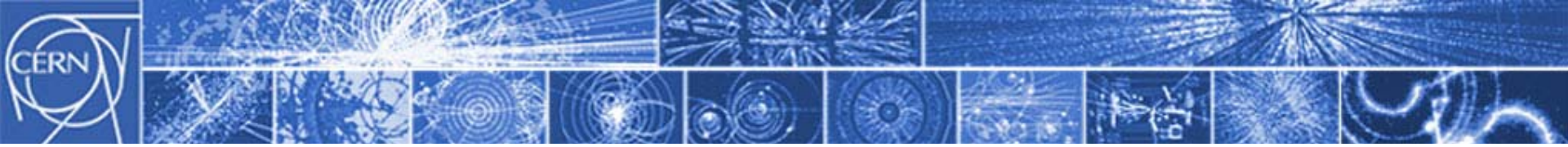


2. SPL progress since December 2008 (3/6)

New planning of Linac4 (~1 year delay...)

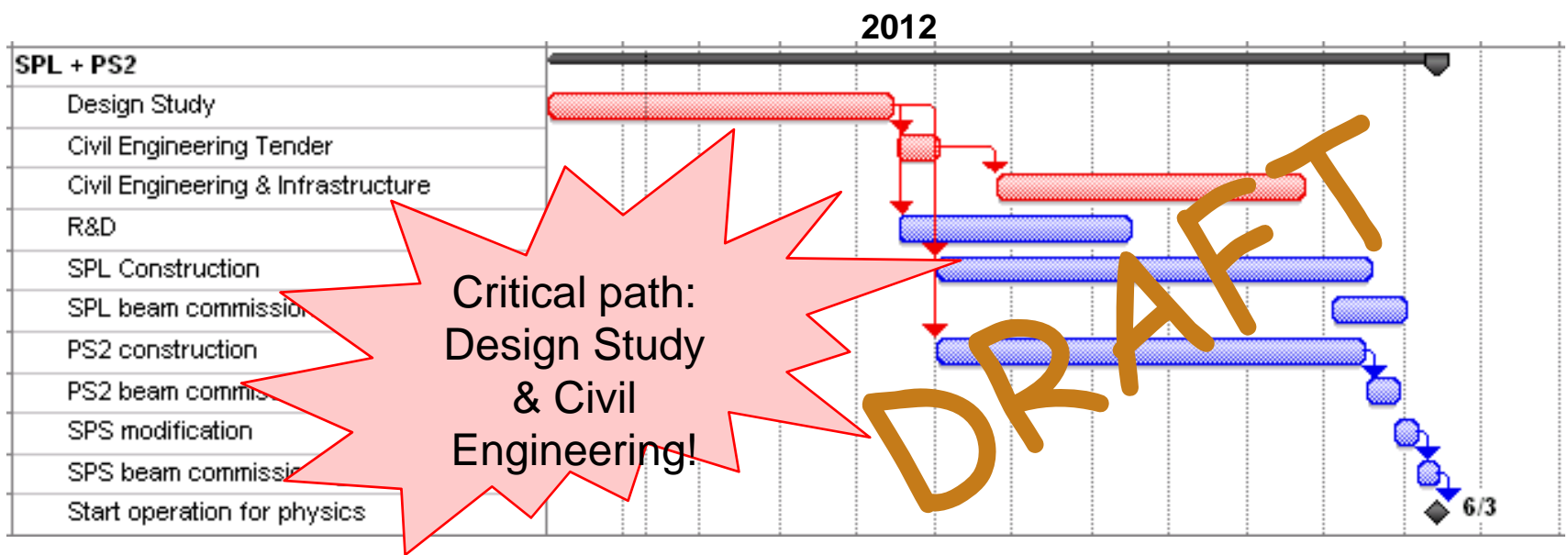


- ### Milestones
- End CE works: December 2010
 - Infrastructure: 2011
 - Installation: 2011-2012
 - Commissioning: 2012-2013
 - Modifications PSB: shut-down 2013/14
 - **Beam from PSB: 1st of April 2014**

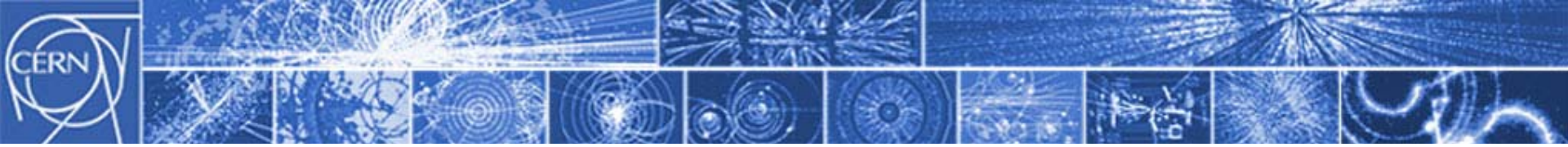


2. SPL progress since December 2008 (4/6)

New planning of SPL and PS2



- First milestones**
- Project proposal: 2011- 2012
 - Project start: January 2013



2. SPL progress since December 2008 (5/6)

Resources: search for additional means to address the uncovered subjects identified during the 1st SPL collaboration meeting.

Table 3: Untreated subjects and suggested actions

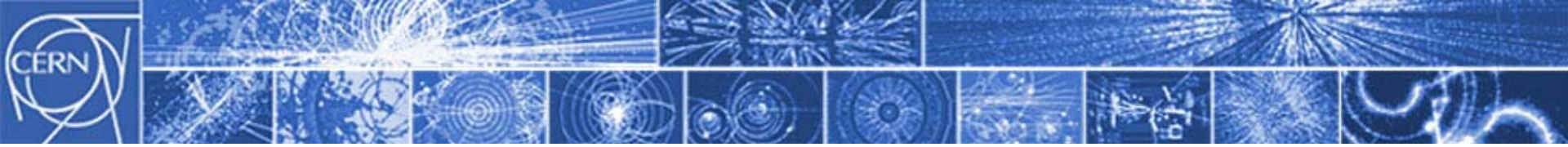
Need	Recommended action	Recommended main contributor(s)
High power RF test stand for cryomodule	Upgrade SM18 test place at CERN	<ul style="list-style-type: none"> • CERN (infrastructure) • ESS-Bilbao (Modulator)
Cost comparison of options for RF power distribution to cavities	Study & discuss	<ul style="list-style-type: none"> • CERN (study) • All partners (discussion)
Test an adequate quantity of cavities (~ 12 $\beta=1$ + 2-4 $\beta=0.65$) and prepare 8 $\beta=1$ cavities for installation in full-size cryostat	Build and test more cavities	<ul style="list-style-type: none"> • Stony Brook – BNL – AES ($\beta=1$) • TRIUMF ($\beta=0.65$) • CERN ($\beta=1$)
Adapt CEA designs for RF coupler and tuner to the SPL	Study / build / test devices and their integration	<ul style="list-style-type: none"> • ?
HOM dampers	Design / build / test devices and their integration	<ul style="list-style-type: none"> • ?
Define longitudinal layout of the SPL (lattice including beam instrumentation and extraction devices)	Design	<ul style="list-style-type: none"> • CERN

Requested from CERN budget + French in-kind

Confirmed commitment from Spain (ESS-Bilbao)

Requested from CERN budget + French in-kind

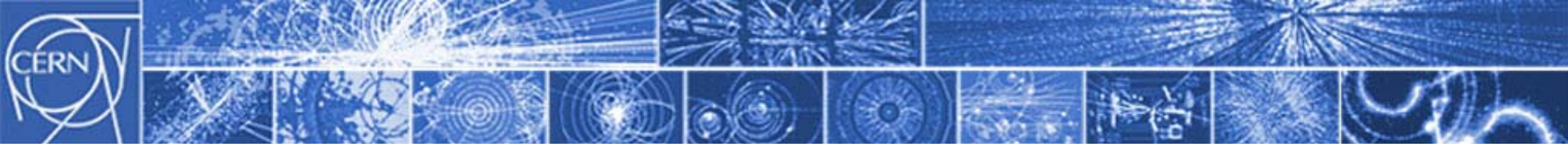
Likely to be co-supported by ESS-Scandinavia



2. SPL progress since December 2008 (6/6)

Progress on technical matters:

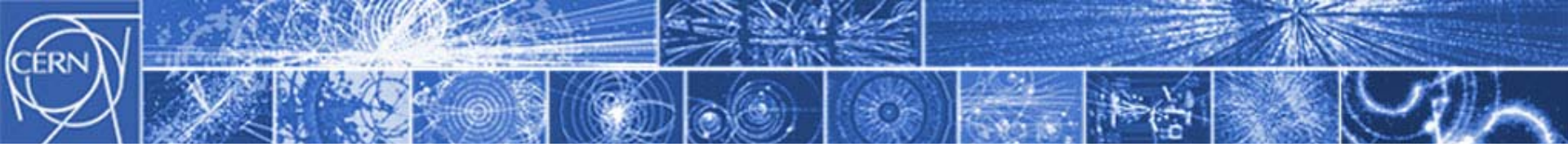
- Choice of $\beta=1$ for the high energy cavities (F. Gerigk et al., “Choice of the optimum beta for the SPL SC cavities”)
- “Healthy” debate on the risks of HOMs... (J. Tuckmantel, “HOM dampers or not in SC RF proton linacs”, CERN BE-Note-2009-009)
to be concluded during a dedicated workshop on June 25-26 at CERN [<http://indico.cern.ch/conferenceDisplay.py?confId=57247>]
- Collection of information/discussion during an ESS-Bilbao workshop on March 16-18 [<http://workshop2009.essbilbao.com/cas/index.aspx>]
- Decision to pass one waveguide per cavity between technical gallery and accelerator tunnel
- Reduction of the beam pulse to match the updated needs of PS2 (0.9 ms instead of 1.2 ms)
- Analysis of beam stability in the accumulator of the SPL-based proton driver (talk at NuFact09)
- Refinement of beam parameters for RIB facility (ies).



3. Work plan of the SPL study (1/3)

Main technical milestones in 2009:

- **Accelerator layout with intermediate energy ejections: 05/2009**
- **HOM damper specifications (?): 06/2009**
[dedicated workshop on June 25-26, 2009 at CERN
(<http://indico.cern.ch/conferenceDisplay.py?confId=57247>)]
- **Location of beam instrumentation: 06/2009**
- **Decision on high power RF source (=> modulator specifications): 08/2009**
- **Orientation of RF coupler: 09/2009**
- **Coordination of sc cavities development: 09/2009**
[dedicated meeting in September 2009 at CERN – before SRF09]
- **Decision on supporting of cryomodules: 10/2009**
- **Decision on sectorization of cryogenics: 10/2009**
[dedicated workshop in September 2009 at CERN]
- **Collection of all parameters for dimensioning tunnels and buildings: 12/2009**



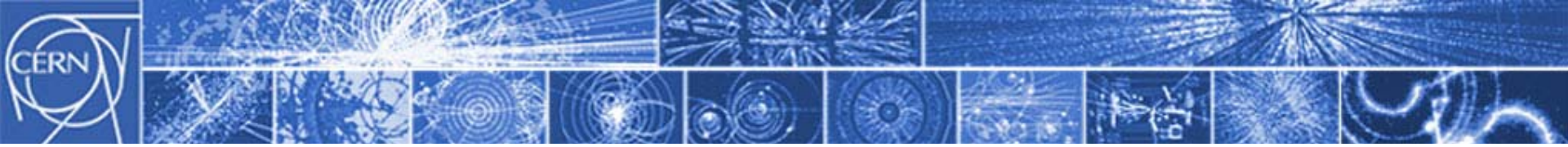
3. Work plan of the SPL study (2/3)

Goals in 2010 and 2011:

- Construction and test of prototypes [cavities and auxiliary equipment (couplers, dampers, tuners), Klystron modulator, ...]
- Order /installation/commissioning of high power RF amplifier
- CE preliminary study and geological investigations
- Impact study
- Upgrade of the SM18 test place [cryogenics and RF]
- Design and construction of prototype cryomodule
- Report writing

Goals in 2012:

- Final edition of report
- Preparation of CE tender documentation
- Impact study report
- Cost estimate
- Equipment and test in SM18 of the fully equipped cryomodule
- Design and preparation of orders for pre-series equipment



3. Work plan of the SPL study (3/3)

Main collaboration events in 2009:

- **Definition of content and signature of technical agreements with more partners [TRIUMF (sc cavities and beam dynamics), ESS-Bilbao (50 Hz modulator for the SM18 test place), ESS-Scandinavia (support for cryomodule construction), Stony Brook/BNL/AES (sc cavities)...]**
- **Edition and signature of SPL collaboration MoU**
- **3rd SPL collaboration meeting: 11/2009 at CERN**