

Working Group

# Novel Acceleration Systems

Preparing for the call “INFRA-2008-1.1.1”

# Agenda

- Preparing for ESGARD Open Meeting
- How to get to the requested package (15 M€ core plus 8 M€ optional)
- Structuring the IA: present status and thoughts
- discussion!

# ESGARD Open Meeting on FP7-IA (OMIA)

- 10.-11. September, CERN Council Chamber
- Please register!

<http://indico.cern.ch/confRegistrationFormDisplay.py?confId=18933>

- Tentative Schedule:

10. Sept	13:15 – 13:30	Welcome (Aymar)
	13:30 – 14:00	Introduction (Aleksan)
	14:00 – 17:30	<b>WG NAS</b> (this one, chair: Jensen)
11. Sept	08:45 – 12:15	WG HIHEP (chair: Garoby)
	13:45 – 17:15	WG SRF-AS (chair: Napoly)
	17:15 – 17:45	Summary (Aleksan)

# WG-NAS presentations, tentative

Presentations: about 20 min each

10. Sept	14:00	Overview, history, aims	E. Jensen
	14:20	High gradient	W. Wuensch
	14:40	Beam Transport (LED+Eurodrive)	D. Schulte
	15:00	Coffee	
	15:30	DR (ex Gadget +)	H. Braun
	15:50	FFAG	F. Méot or R. Edgecock
	16:10	Posipol	A. Variola
	16:30	MICE	A. Blondel or P. Kyberd
	16:50	Additional ILC high priority	P. Burrows
	17:10	Discussion	

# Characteristics of the proposed activities

- Focused on accelerator R&D beyond the LHC, complementing the activities of the preparatory working groups on “*High Intensity Protons*” and “*Superconducting RF*”, but varied in technologies.
  - CLIC and ILC (except for superconducting RF)
  - Neutrino factory
  - ~~Laser-Plasma acceleration~~ now in “Laserlab II”, but some beam diagnostics!
- Subjects investigated in the supported infrastructures – JRA’s:
  - Highest gradient acceleration (normal cond., CLIC & muon cooling)
  - High power RF generation (muon cooling & SPS upgrade)
  - Very small emittance beam transport, diagnostics and stabilisation
  - Drive beam issues – alignment, tuning,  $\phi$ -feedback
  - Damping ring issues: SC wiggler, instrumentation, IBS, e-cloud
  - FFAG (both for muon & proton acceleration)
  - Muon cooling (access to MICE facility)
  - Polarized positrons by Compton backscattering (for ILC & CLIC)
- Additional R&D requests identified as high priority for ILC
  - Undulator based positron source (ILC baseline)
  - Beam instrumentation (laser wire, ...)
  - damping ring studies



# Characteristics of the proposed activities (contd.)

- Trans-National Access:
  - MICE facility @RAL!
  - CTF3 @CERN (in discussion)
- Network Activities (in discussion)

*Food for (your) thought: Orthogonal to the JRA's and across the different working groups!*

- next “BENE” (“MEGLIO”?)
- next “HHH” concerns this WG less.
- Do we need a next “ELAN”? Networks for ILC & CLIC are existing and functioning!
- In my view, the overall “management” of the IA is a NA.

# Existing research infrastructures

The proposed activities will support and optimize the use of the following existing research infrastructures (non-exhaustive list):

- CTF3 @ CERN
  - Two-beam test stand (2BTS)
  - Test beam linac (TBL)
  - Instrumentation test beam (ITL)
  - Combiner Ring (CR)
  - Probe beam injector “CALiFES”
  - X-band klystron Test-stand (XBKTS, to be ready in 2009)
- MICE @ RAL
- LHC injector chain @ CERN
  - In particular SPS high power RF system
- EMMA (Electron Model for Muon Acceleration) @ Daresbury (to be ready 2009)
- SLS (Swiss Light Source) @ PSI
- ANKA (ÅNgströmquelle KARlsruhe) @ FZK
- ATF/ATF2 @ KEK
- DAΦNE @ INFN/LNF

Now the difficult part:

## Overall financial volume

- We are requested to define a package of total 23 M€! (15 M€ “core” + 8 M€ “optional”)!

(see <http://indico.cern.ch/materialDisplay.py?categId=1605&materialId=minutes>)

Some definitions:

- “Total”: Own contribution plus requested, full cost (direct plus indirect). Do not count existing material! The ratio requested/own must not be above 0.5!
- “Optional”: this will give the next “special” ESGARD meeting with the directors of the lab to modulate. They will then decide, what will remain. In the request to Brussels, nothing will be “optional”.



# How?

- We have already progressed, and the remaining requests are OK for their scientific value, priority, support of existing infrastructure – this way it will be difficult to further reduce! **But the overall volume is still too big!**
- The only way I see:

## **Get financial commitments for the matching funds!**

- Thought:
  - If some activity is high priority for lab X, lab X must be willing to invest into it.
  - If nobody is ready to invest in an activity Y, activity Y will have to drop off the list even if previously marked as priority.
- This seems to be the only way to get priorities and commitments consistent.
- Consequence: **Make sure you get the templates filled for all activities!**
- ... with the ratio of (EU requested)/(own contribution)  $\leq 0.5!$

**Deadline: September 6<sup>th</sup>! (in 2 weeks)**

# On the 7<sup>th</sup> of September:

- If the overall sum of the templates exceeds 15 M€, we will have to decide which part is optional.
- If the overall sum of the templates exceeds 23 M€, we will have to arbitrate!
- But first, let us get those numbers together!
- Having said this, the following list is only indicative!

# Modified: Joint Research Activities 1

- High Gradient RF Structures (estimate 4 M€)
  - CLIC & muon cooling,
  - Main subjects: structure HG tests (@ 12 GHz & 200 MHz), surface topology, breakdown modelling, CD spark tests, fatigue tests, interaction with beam, module testing.
  - Main collaborators: BINP, CERN, CIEMAT, Cockcroft, HIP, INFN/LNF, IAP Ukraine, SLAC, VTT
- Drive beam issues (estimate 2 M€+1M€ beam dynamics simulations )
  - CLIC & X-FEL (phase jitter correction)
  - Main subjects: decelerator alignment & tuning methods, machine protection system, beam phase jitter measurement & correction, benchmarking of beam dynamics simulations .
  - Main collaborators: CERN, CIEMAT?, DESY?, INFN/LNF, JAI, PSI, U. Valencia
- LED (Luminosity Ensuring Design, 2 M€+1M€ intrapulse tuning concepts)
  - CLIC & ILC
  - Main subjects: precision alignment, FF stabilization (0.2 nm), intrapulse tuning concepts.
  - Main collaborators: CERN, CIEMAT?, DESY?, LAPP, INFN/LNF?, JAI, U. de Savoie, U. Valencia, Uppsala U.
- GaDGET (Generation & Diagnostic Gear for tiny emittance, 3 M€ +1.5 M€ low ripple damping ring extraction kicker & LPA specialized diagnostics)
  - CLIC, ILC, (damping rings)...
  - Main subjects: Tests of high field SC wigglers, dedicated beam instrumentation, measure IBS theory prediction, low ripple damping ring extraction kicker
  - Main collaborators: ANKA, BINP, Dapnia/CEA, CERN, EPFL, Lancaster U., JAI, PSI

## Modified: Joint Research Activities 2

- FFAG (estimate 3 M€)
  - Neutrino Factory (muons & protons)
  - Main subjects: Lattice design & beam dynamics studies, component design studies, prototyping & tests.
  - Main collaborators: IN2P3/LPSC, PSI, STFC
- Posipol (estimate 0 M€+3.5M€) propose in next call (2010)
  - CLIC & ILC
  - Main subjects: Compton ring and collection system design, laser & laser cavity development, polarimetry, tests at DAΦNE and ATF
  - Main collaborators: BINP, CERN, DESY/Zeuthen, IN2P3/IPNL, IN2P3/LAL, INFN/LNF, KEK
- High power RF (estimate 0 M€+1M€)
  - Develop scalable 200 MHz high power amplifier
  - Main collaborators: CERN, LANL, U. Lancaster, CEA?, plus industrial partners (Thales?)

***Today's total estimate of JRA's: 14 M€ + 8 M€***

***NA plus TNA: 1 M€ + 0***

- Since we could not fit all the additional requests identified as high priority by ILC-GDE, we would like to have them presented separately on the 10<sup>th</sup> of September.