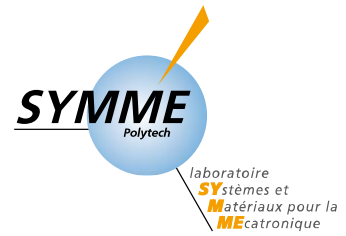




Laboratoire d'Anecy-le-Vieux
de Physique des Particules



CLIC stabilisation contribution

A.Jeremie, B.Caron,

A.Badel, R.LeBreton, J.Lottin,

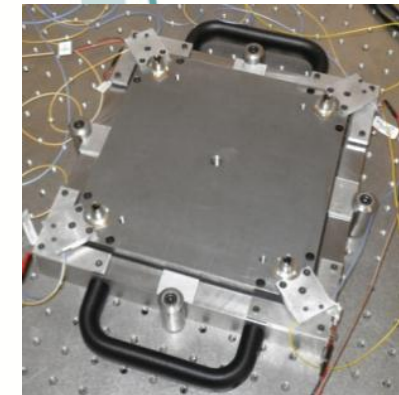
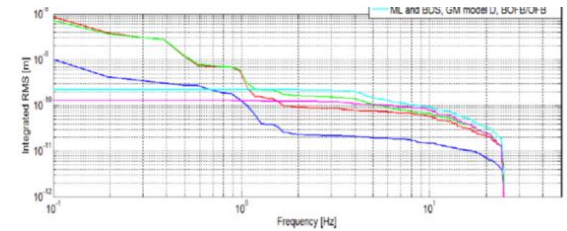
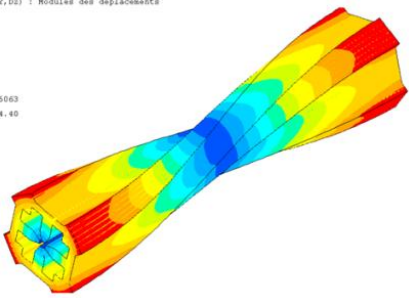
G.Balik, J.P.Baud, L.Brunetti, G.Deleglise, S.Vilalte



In2p3

Ongoing collaboration since 2005 (CARE, EUROTeV, EuCARD)

- Stabilisation feasibility: 0,13nm at 4Hz
- Mechanical dynamic simulations and measurements: simulations agree with measurements => predictive tool
- Integrated feedback studies: IP feedback, mechanical support specs, BPM noise specs, ML specs...
- Active/passive quadrupole support study

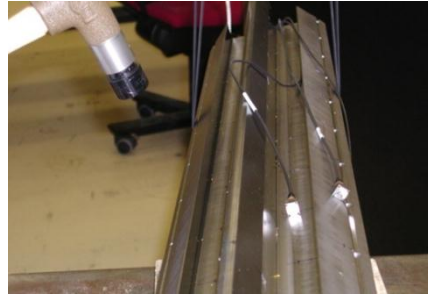
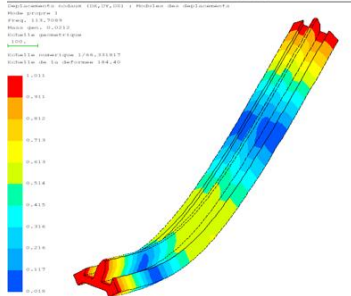


CTC WP related items

Eigenmodes of Type 4 ML magnet

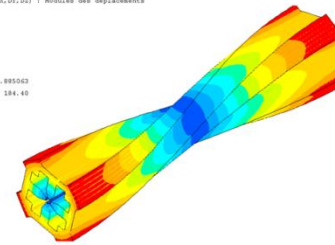
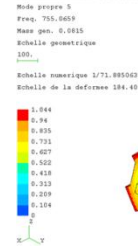
Single pole

Analyse modale libre libre un pôle seul



Assembled magnet

Deplacements nodaux (DE,DF,DD) : Module des déplacements



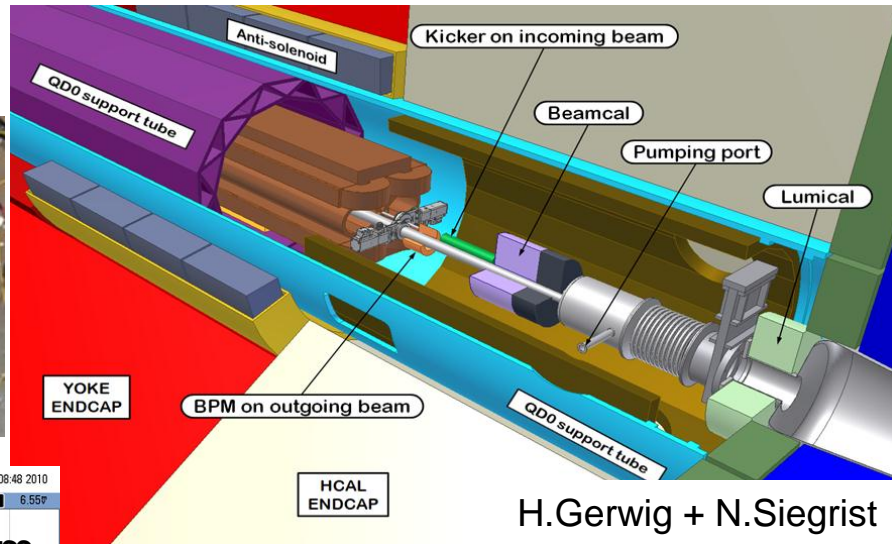
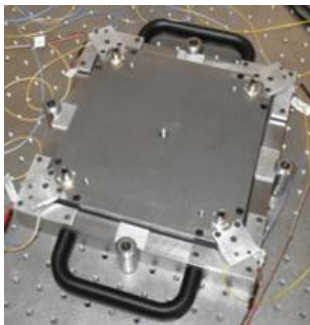
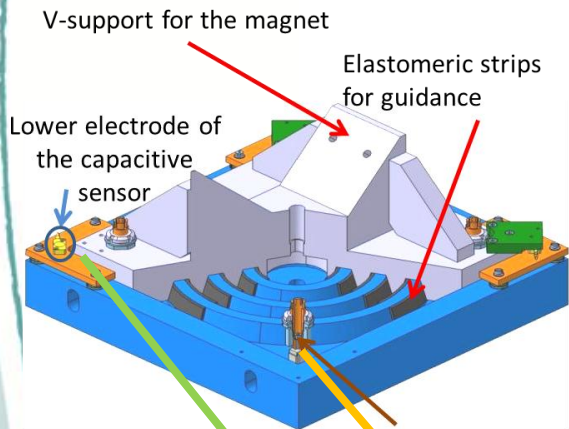
Mode	Experimental frequency (Hz) at LAPP	Computed frequency (Hz)
1	115	114
2	205	212
3	272	278
4	306	306

Mode	Experimental frequency (Hz) at CERN	Computed frequency (Hz)
1&2	264	279
3&4	628	676
5	656	684

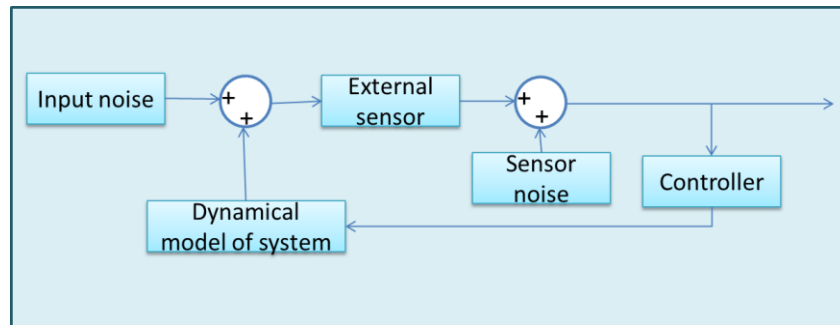
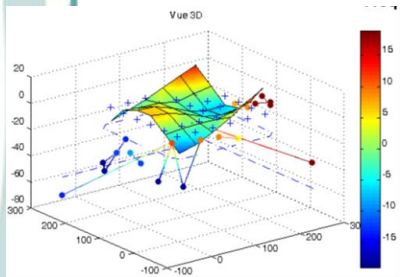
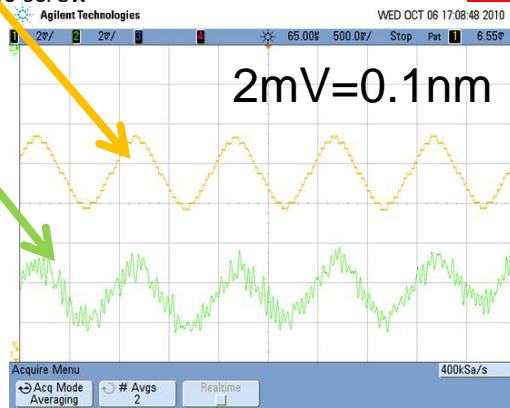
Simulations and measurements agree : Validation of FE simulations, measure damping, excellent diagnostics tool

CTC WP related items

Active/passive mechanical support for FF quadrupole



Piezoelectric actuator below its micrometric screw



Simulations and system tests ongoing

Plans for 2012-2016

- Integrated feedback studies integrate elements with more details as they are developed
- Active/passive mechanical support for FF quadrupole: development in progress
- QD0 mechanical studies and vibration measurements on prototype; and stabilisation integration studies for QD0 in detector and at end of tunnel
- Sensor studies: sensor models for simulations, sensor development if needed

LAPP stabilisation

Collaborators: general information and resource estimate

Institute: LAPP-IN2P3/CNRS-Université de Savoie

Main contacts: Andrea JEREMIE

CERN responsible: Daniel Schulte and Kurt Artoos

Activity/work

package/task: BPH-SIM, BPH-MDI and CTC-003

1) Integrated feedback studies, 2) stabilisation system characterisation and feedback development and 3) mechanical simulations and developments

Technical subject:

Group working in Annecy with frequent presentations and discussion at CERN, frequent visits and common workshops, hardware at home, testing at best facility (CERN or ATF2...)
Funding within EuCARD until March 2013,

Working arrangement:

Funding status:

Asking again for a French ANR funding
CFT3 collaboration agreement, protocol(annex) to CERN co-operation agreement, K-contract

Formal agreement:

K1597

SYMME stabilisation

Collaborators: general information and resource estimate

Institute:	SYMME Université de Savoie (formerly ESIA)
Main contacts:	Bernard Caron
CERN responsible:	Daniel Schulte and Kurt Artoos
Activity/work package/task:	BPH-SIM and CTC-003
Technical subject:	1) Integrated feedback studies and 2) stabilisation system characterisation and feedback development
Working arrangement:	Group working in Annecy with frequent presentations and discussion at CERN, PhD student in Annecy (until end 2012), frequent visits and common workshops, hardware at home, testing at best facility (CERN or ATF2...)
Funding status:	No secured funding except permanent personnel involved, Asking again for French ANR funding
Formal agreement:	CFT3 collaboration agreement, protocol(annex) to CERN co-operation agreement (maybe just together with LAPP?)

Total: Quad stability + MDI + Beam parameters

	Collaborator (MoU)		Collaborator (possible)		
	P (FTE)	M (KCHF)	P (FTE)	M (KCHF)	
2012	Total:	5,1	169	0	39
	LAPP	3,7	156	0	39
	Symme	1,4	13	0	0
	Collaborator (MoU)		Collaborator (possible)		
	P (FTE)	M (KCHF)	P (FTE)	M (KCHF)	
2013	Total:	3,1	39	0	39
	LAPP	2,7	39	0	39
	Symme	0,4	0	0	0
	Collaborator (MoU)		Collaborator (possible)		
	P (FTE)	M (KCHF)	P (FTE)	M (KCHF)	
2014	Total:	3,1	0	0	39
	LAPP	2,7	0	0	39
	Symme	0,4	0	0	0
	Collaborator (MoU)		Collaborator (possible)		
	P (FTE)	M (KCHF)	P (FTE)	M (KCHF)	
2015	Total:	2,3	0	0	39
	LAPP	1,9	0	0,5	39
	Symme	0,4	0	0	0
	Collaborator (MoU)		Collaborator (possible)		
	P (FTE)	M (KCHF)	P (FTE)	M (KCHF)	
2016	Total:	2,3	0	0	39
	LAPP	1,9	0	0,5	39
	Symme	0,4	0	0	0

Comments

- Work done within the LAViSta team in Annecy composed of LAPP and SYMME personnel and laboratory space: will soon (2012) move in common space in “Maison de la Mécatronique”
- Known contribution from **EuCARD until March 2013**
- Nothing after that date (stabilisation not in EuCARD2, nor TIARA...)
- Asking for French funding through ANR at the end of this year.
- CNRS has announced drastic funding cuts in future!

Publications

C.Adloff et al, REM 2005 or LAPP-TECH-2005-01.

B.Bolzon et al, Nanobeam 2005 EUROTeV-Report 2005-020-1

Ch.Boulais, et al., CARE/ELAN Note-2004-005.

G.Guignard, A.Jeremie, Y.Karyotakis, CARE Note-05-005-ELAN.

J. Lottin et al, CARE/ELAN document-2006-001.

L. Brunetti, “Rejet de vibrations dans une structure mécanique linéaire”, Mémoire C.N.A.M., Conservatoire Nationale des Arts et Métiers, 02 juin 2006

L Brunetti et al, “Status report on active stabilisation of a linear collider final focus quadrupole mock-up”, EUROTeV-Report-2006-097

L. Brunetti et al, LCWS, ILC 2007, LAPP-TECH-2007-01

N. Geffroy et al, “Creation of a State-Space Model from a Finite Element Model for the active control algorithm efficiency tests”, EUROTeVReport-2007-054

J. Lottin et al, REM 2006,

B. Bolzon, “Etude des vibrations et de la stabilisation à l'échelle sous-nanométrique des doublets finaux d'un collisionneur linéaire,” Thèse, Université de Savoie, 2007, 197 pages, aussi comme LAPP-T-2007-05.<http://tel.archives-ouvertes.fr/tel-00238553/fr/>

B. Bolzon, et al NANOBEAM'08, LAPP-TECH-2008-05 .

N. Geffroy et al Mecatronics08

L.Brunetti et al epac08

PAC 2009,A.Seryi et al FR1RAI03, K.Artoos et al,TH5RFP080, K.Artoos et al TH5RFP081, R.Tomas et al WE6PFP023

IPAC 2011: J.Snuverink et al,TUPC023, G.Balik et al MOPO001, K.Artoos et al MOPO028

G.Balik et al, Mecatronics 2010

G.Balik et al , ICINCO 2011

B.Caron et al Control and engineering practice, accepted for publication

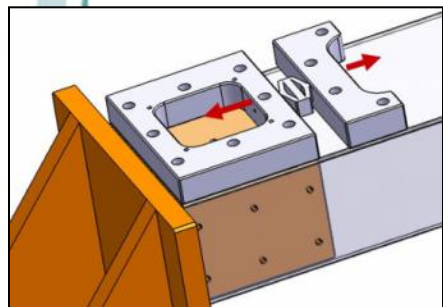
And other accelerator related publications

spare

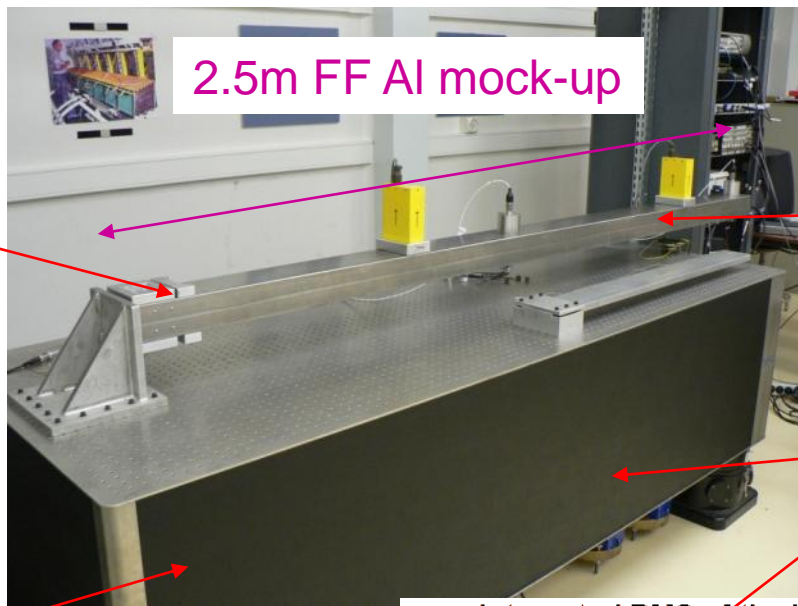
Feasibility already demonstrated

Cantilever FF stabilisation

LAPP active system
for resonance rejection



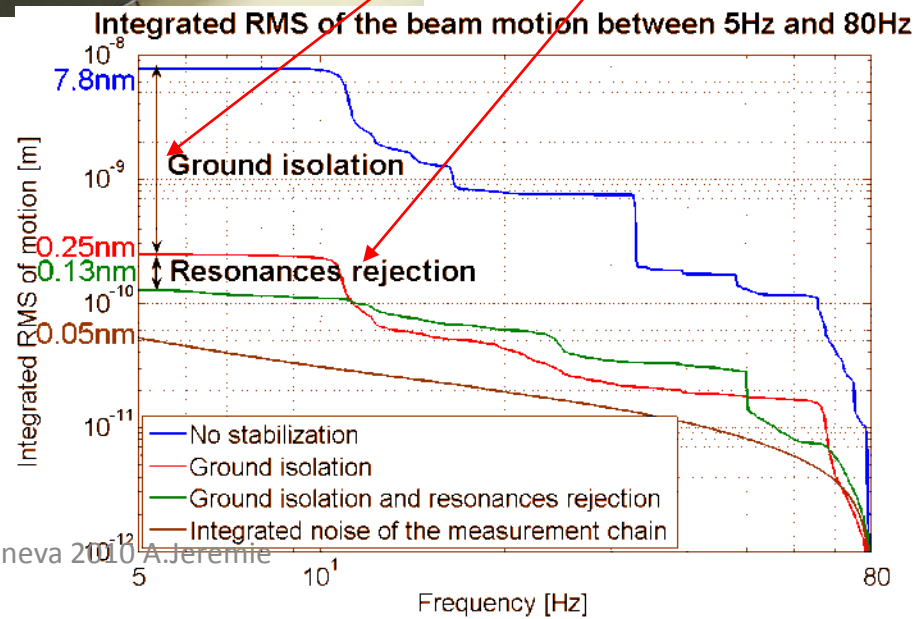
2.5m FF Al mock-up



Resonance rejection

Isolation

CERN TMC active
table for isolation



➤ The two first resonances entirely rejected

➤ Achieved integrated rms of 0.13nm at 5Hz