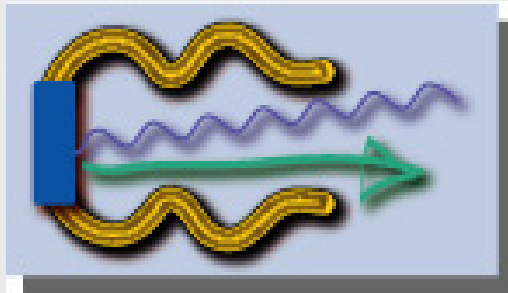
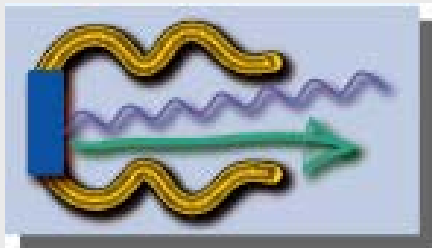


# Charge production with Photo-injectors PHIN JRA



Andrea Ghigo and Roberto Losito

4<sup>th</sup> JRA2-PHIN Collaboration Meeting CERN 23-25 November 2005



Institute	Acronym	Country	Coordinator	PHIN Scientific Contact	Associated to
CCLRC Rutheford Appleton Lab. (22)	<b>CCLRC-RAL</b>	<b>UK</b>	P. Norton	I.N. Ross	
CERN Geneva (19)	<b>CERN</b>	<b>CH</b>	H. Haseroth	G. Suberlucq	
CNRS-IN2P3 Orsay (3)	<b>CNRS-LAL</b>	<b>F</b>	T. Garvey	G. Bienvenu	<b>CNRS</b>
CNRS Lab. Optique Appl. Palaiseau (3)	<b>CNRS-LOA</b>	<b>F</b>	T. Garvey	V. Malka	<b>CNRS</b>
ForschungsZentrum ELBE (10)	<b>FZR-ELBE</b>	<b>D</b>	J. Teichert	J. Teichert	
INFN-Lab. Nazionali di Frascati (11)	<b>INFN-LNF</b>	<b>I</b>	S. Guiducci	A. Ghigo	<b>INFN</b>
INFN- Milan (11)	<b>INFN-MI</b>	<b>I</b>	C. Pagani	I. Boscolo	<b>INFN</b>
Twente University- Enschede (13)	<b>TEU</b>	<b>NL</b>	J.W.J. Verschuur	J.W.J. Verschuur	



# PHIN JRA addressed to

2003

- ➡ Development of the high charge  $e^-$  beam (**drive beam**) for the RF power source of the two-beam linear collider **CLIC** (CERN).
- ➡ Realisation of high brightness  $e^-$  beam for **CLIC main beam** studies and for tests of linear collider sub-systems.
- ➡ Realisation of the first high power photoinjector that uses a photocathode, laser driven, in a superconducting RF gun for application in **ELBE** (Rossendorf) and possible use in **TESLA Test Facility** (Desy).
- ➡ Study of the **TESLA** electron source.
- ➡ Realisation of new electron source for **NEPAL** (Orsay) test stand.
- ➡ Realisation of the new injector for **TEU-FEL** (Twente).

# PHIN Objectives

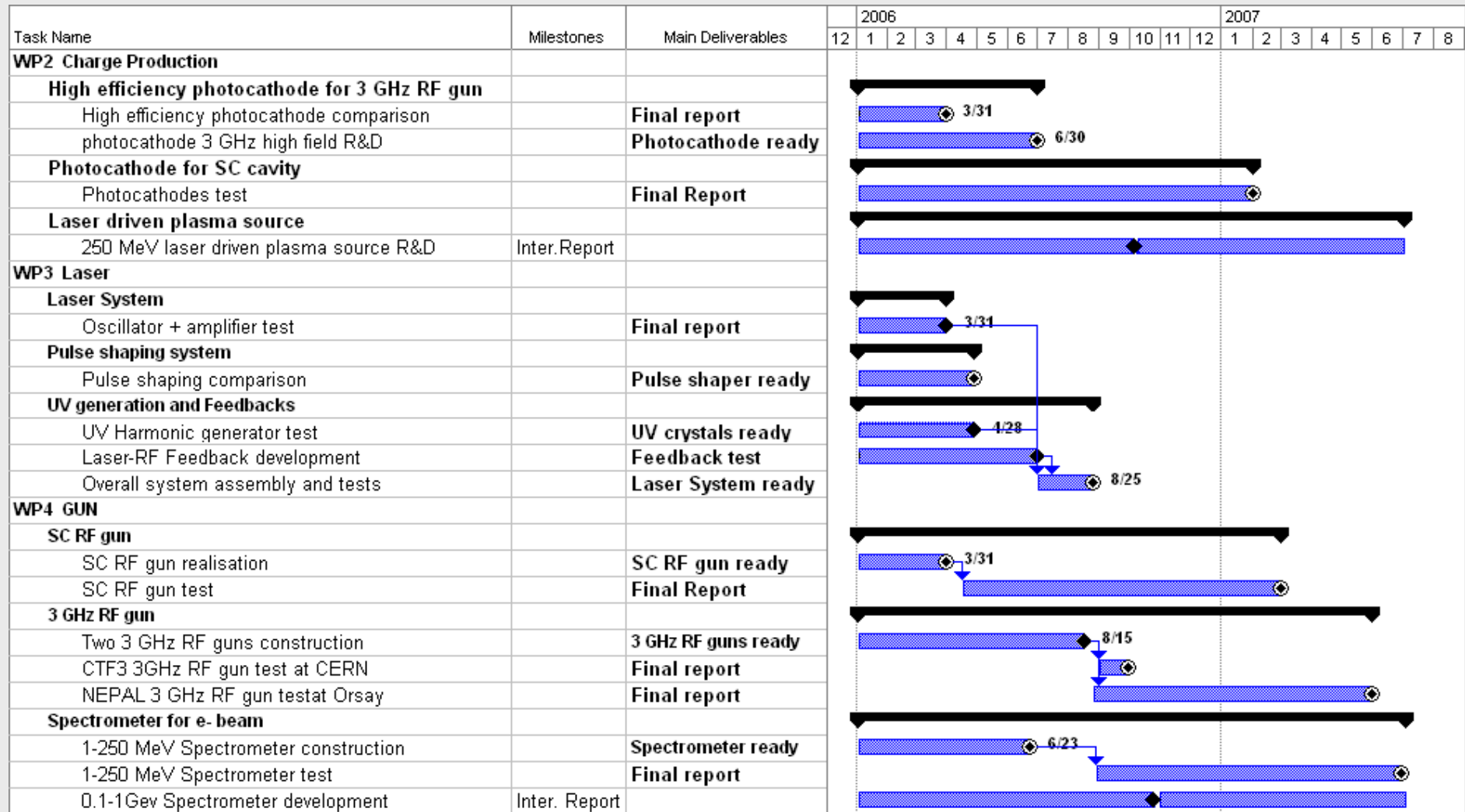
2003

- ✱ Study and model the **beam dynamics** in the RF gun.
- ✱ Develop Normal and Super Conducting **RF-guns** for medium-high charges.
- ✱ Optimize the **RF guns** in order to satisfy thermal constraints and vacuum requirements of photo-cathode.
- ✱ Optimize the combined system laser-photo-cathode for various applications, seeking for a trade-of between cathode **lifetime**, **laser power** and wavelength.
- ✱ Study and develop optical and laser installations for the generation of the various space and time **beam-distributions** related to the various PI applications.
- ✱ Investigate means of generating complex **timing**, and of **shaping** laser pulses.
- ✱ Develop necessary **instrumentation**.
- ✱ Make the necessary developments to improve existing installations in order to satisfy the objectives.

## **Deliverables 1/1/2006 – 30/6/2007**

<b>PHIN</b>	<b>23</b>	<b>Two 3 GHz RF guns construction</b>	<b>Prototype</b>	<b>WP4</b>	<b>CNRS-Orsay</b>	<b>18</b>
<b>PHIN</b>	<b>22</b>	<b>Laser RF feedback development</b>	<b>Report</b>	<b>WP3</b>	<b>CERN</b>	<b>21</b>
<b>PHIN</b>	<b>10</b>	<b>Photocathode ready for 3 GHz RF guns</b>	<b>Prototype</b>	<b>WP2</b>	<b>CERN</b>	<b>25</b>
<b>PHIN</b>	<b>11</b>	<b>UV generation and feedback: overall system assembly and tests</b>	<b>Prototype</b>	<b>WP3</b>	<b>CCLRC</b>	<b>30</b>
<b>PHIN</b>	<b>12</b>	<b>SC RF gun realisation</b>	<b>Prototype</b>	<b>WP4</b>	<b>FZR</b>	<b>26</b>
<b>PHIN</b>	<b>13</b>	<b>SC RF gun test</b>	<b>Report</b>	<b>WP4</b>	<b>FZR</b>	<b>36</b>
<b>PHIN</b>	<b>20</b>	<b>Pulse shaping comparison</b>	<b>Prototype</b>	<b>WP3</b>	<b>INFN – LNF, MI</b>	<b>22</b>
<b>PHIN</b>	<b>14</b>	<b>CTF3 3 GHz RF gun test at CERN</b>	<b>Report</b>	<b>WP4</b>	<b>CNRS. CERN</b>	<b>33</b>
<b>PHIN</b>	<b>27</b>	<b>Superconducting cavity photocathode tests</b>	<b>Report</b>	<b>WP2</b>	<b>FZR</b>	<b>37</b>
<b>PHIN</b>	<b>28</b>	<b>Final report on 100 MeV laser driven plasma source R&amp;D</b>	<b>Report</b>	<b>WP2</b>	<b>CNRS-LOA</b>	<b>48</b>

## JRA2-PHIN schedule for the next 18 months



## Budget for the next 18 months [January 1th 2006 to June 30 2007]

JRA2	Participant (cost model)	Permanent Staff direct cost ONLY (Euros)	Additional Staff direct cost ONLY (Euros)	Durable Equipment direct cost ONLY (Euros)	Consumables and Prototyping direct cost ONLY (Euros)	Travel direct cost ONLY (Euros)	All Direct Cost	Subcontract	Indirect cost	Expected costs including indirect cost (Euros)	Requested funding (Euros)
3	CNRS-Orsay	384,375	35,000	90,000	10,000	5,000	524,375	0	104,875	629,250	175000
	CNRS-LOA	120,000	60,000	0	112,000	10,000	302,000	0	60,400	362,400	105000
	CNRS(FCF)	504,375	95,000	90,000	122,000	15,000	826,375	0	165,275	991,650	280000
9	FZR(AC)	0	45,917	0	39,858	0	85,775	0	17,155	102,930	102930
10	INFN-LNF	0	80,000	0	33,333	10,000	123,333	0	24,667	148,000	148000
	INFN-Mi	0	80,000	0	25,000	6,667	111,667	0	22,333	134,000	134000
	INFN(AC)	0	160,000	0	58,333	16,667	235,000	0	47,000	282,000	282000
11	TEU(FC)	35,910	167,580	0	45,000	5,000	253,490	0		253,490	101773
17	CERN (AC)	0	42,500	0	940,000	18,417	1,000,917	0	200,183	1,201,100	779200
20	CCLRC-RAL (FC)	13,719	28,843	0	0	6,620	49,182	0	59582	108,764	11000
	<b>Grand total</b>	<b>554,004</b>	<b>539,840</b>	<b>90,000</b>	<b>1,205,192</b>	<b>61,703</b>	<b>2,450,739</b>	<b>0</b>	<b>489,195</b>	<b>2,939,934</b>	<b>1,556,903</b>