

First beta beam task meeting
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CERN

Eurisol « Heavy ion accelerator » task

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Heavy Ion Accelerator Design :

“ This task should continue the work already conducted of the task Post Accelerator and Mass Separator of EURISOL-RTD , studying in depth dynamics, beam transport and matching of the beam characteristics with the needs of the future experimental campaigns.

This task will *move from a conceptual design to a much more engineering oriented study*, which should better outline and start to freeze technical choices for the subsystems and components of the HI-Accelerator included in the Eurisol machine chain.”

(task group coordinator M. H. Mostatello)

Sub tasks of « heavy Ion Accelerator Design Task » :

Normal conducting RFQ	(O. Kester, Munchen)
Super conducting RFQ	(G. Bisoffi, INFN-LNL)
Diagnostics and beam loss detectors	(N. Orr , GANIL)
High frequency chopper	(M. Di Giacomo, GANIL)
Beam dynamics	(P. Bertrand, GANIL)

Associated tasks

Beam preparation	(A. Jokinen)
Safety and radioprotection	(D. Ridikas)
Cryomodule development	(S. Bousson)
Beta beam aspects	(M. Benedikt, M. Lindroos)

Normal conducting RFQ sub task (O. Kester, Munchen)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Assembly of IH-RFQ												
Design and assembly of test bench												
pre-buncher design												
RFQ power tests												
Design 200 MHz IH and CH structures												
Design low level rf												
Design power amplifier												

MAFF IH-RFQ : 101.28 Mhz)

Pre-Buncher : 12.66 Mhz

- Preliminary beam dynamics with the three RFQs (available resources) – 1st year
- More precise beam dynamics and RFQ design, beginning of engineering for private manufacturing of SRFQs (av. resources + 1 year post-doc) – 2nd year
- Completion of engineering, comparison with NC option, cost estimate (av. res) – half of 3rd year

1. Experimental requirements – beam & machine characteristics

- a. Establish, on the basis of the requirements of the prototypical experiments, the secondary beam characteristics (emittance, energy ranges, variability, energy spread, time structure...)
- b. provide a liason with the physics and instrumentation group

2. High energy radioactive-ion Beam Diagnostics

- a. Explore the various options for detectors to perform diagnostic measurements of the high energy (>20 MeV/nucleon) secondary beams at very low intensities (few pps – 10000 pps)
- b. build and test prototype detectors

Preliminary 12-month program

- By March: Analysis of the existing project. specifications and solutions:
RIA, CERN, SNS
- By June: Definition of the Eurisol Specs.
- By December: Prototype Conceptual design.

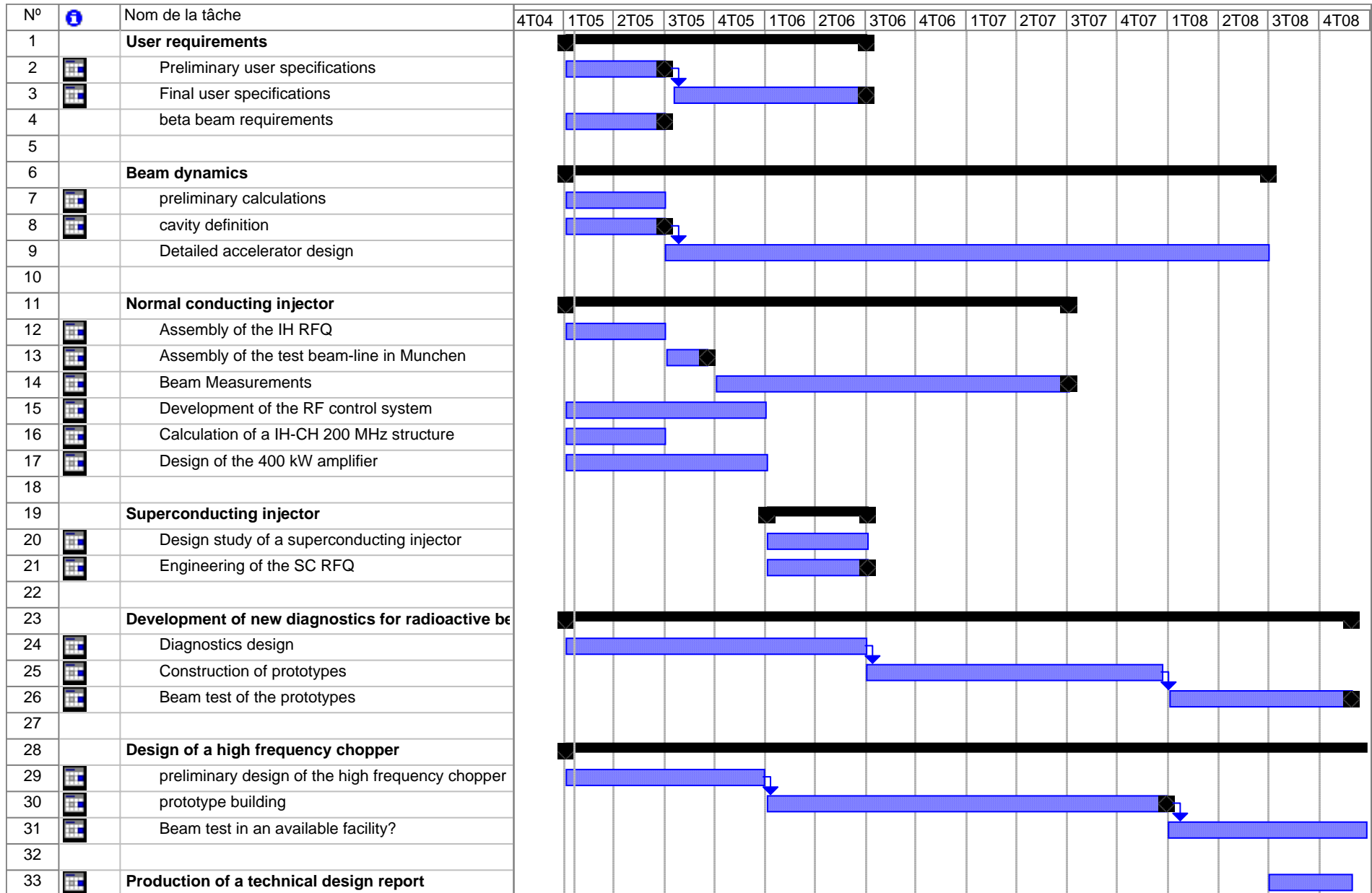
Preliminary 4-year program

- 2005 1st 6m : Specifications of the Eurisol and SPIRAL2 devices
- 2005 2nd 6m: PD available, Conceptual design
- 2006: Prototype design and order
- 2007: Prototype manufacture
- 2008: Tests.

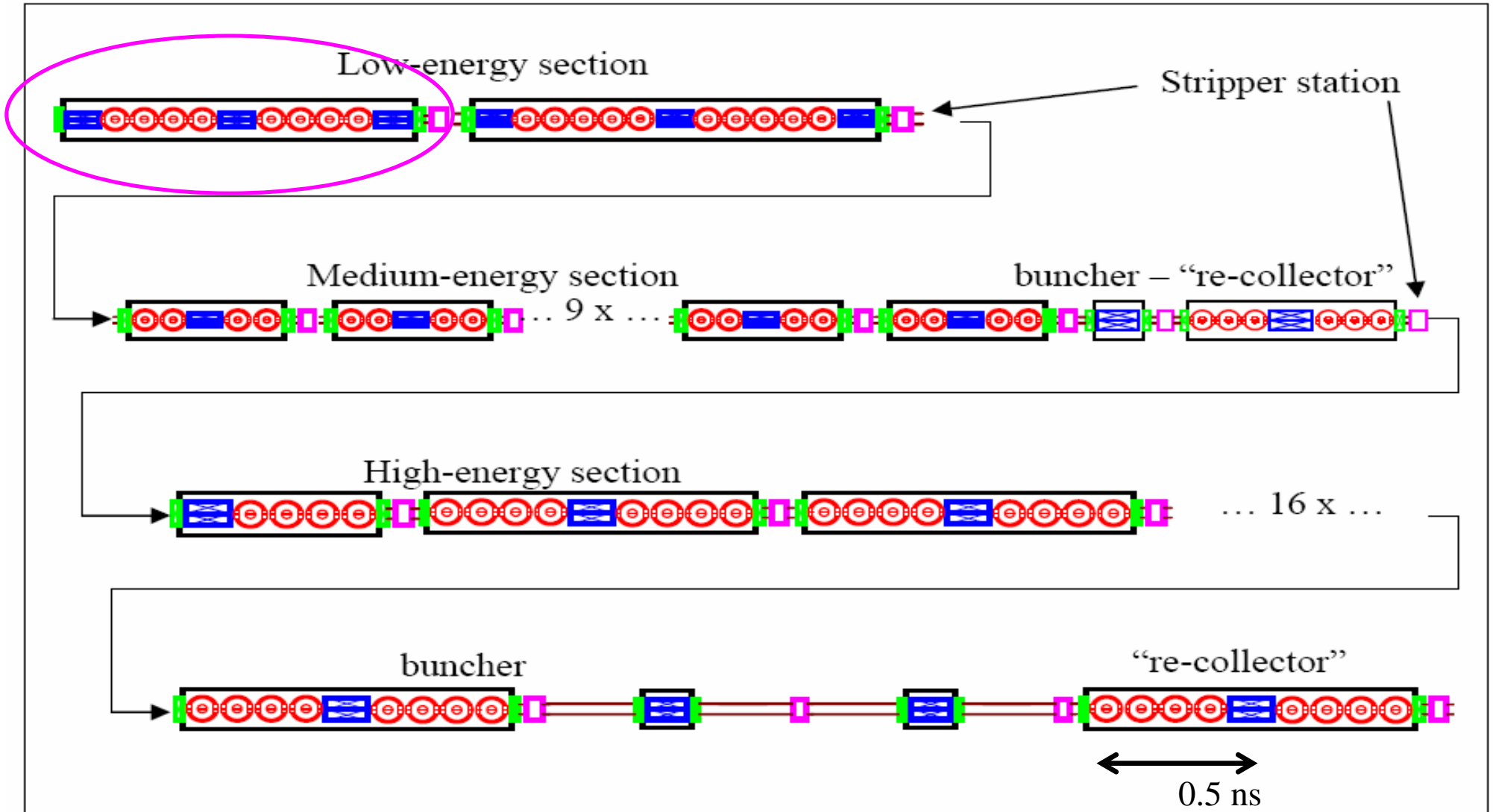
Beam dynamics sub task : first year

- 1 Choice of a reference simulation code, identification of new code developments needed, up-grading and benchmarking (+3 months)
Design codes, TRACEWIN = reference (LIONS_LINAC as a complement)
- 2 Acquisition from other tasks of the main beam specifications needed to start the design.
 - a. Reference beam characteristics & specifications (+3 months)
 - b. Other beam characteristics & specifications (q/A...) (+3 months)
- 3 Design of a preliminary layout of the 100 MeV/u SC linac, *from the injector output*
 - a. Preliminary choice of the SC linac input energy and of the beam frequency , (3 months)
 - b. First optimisation of the main linac parameters, without stripping sections : SC cavity types, number of families, beta and frequency transitions, focusing scheme... (9 months)
 - c. Same linac design including strippers ; comparison, and choice of the number of stripping sections (12 months)

Heavy Ion Accelerator- Preliminary time-schedule

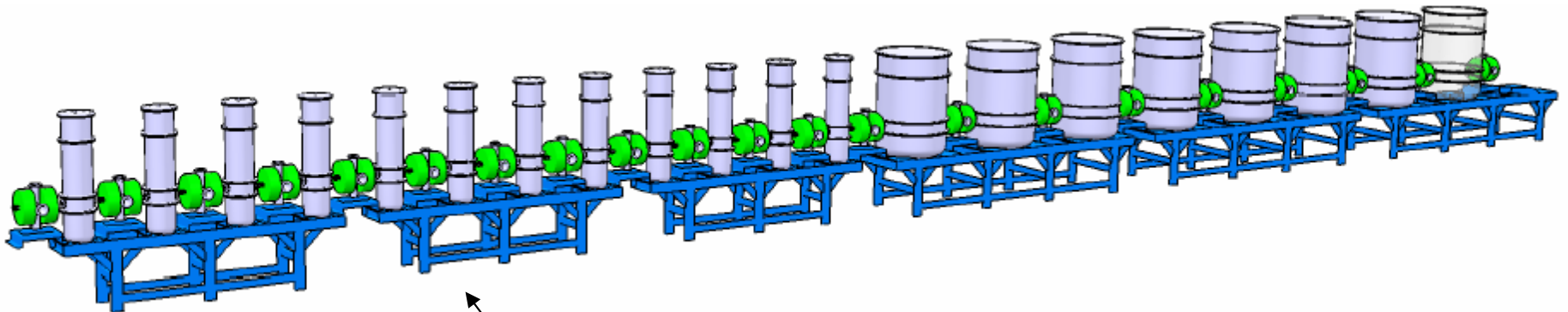


The 2002-2003 linac layout
(Dan Berkovicz Alberto Facco)



New study proposed (2005...)

We propose to optimise and study a new design based on the solutions adopted for the Spiral II project, in particular for the first part of the LINAC



Short cryostats

Questions related to the beta beam :

1. Could Frankfurt or GSI look at a dedicated machine ?

Diagnostics implications ?

Injection ?

2. What we can do :

a. look at the RF implications (cost, Lorentz forces ...)

b. look at 7.5 mA from the beam dynamics point of view

First preliminary design , by Jean Luc Biarotte...