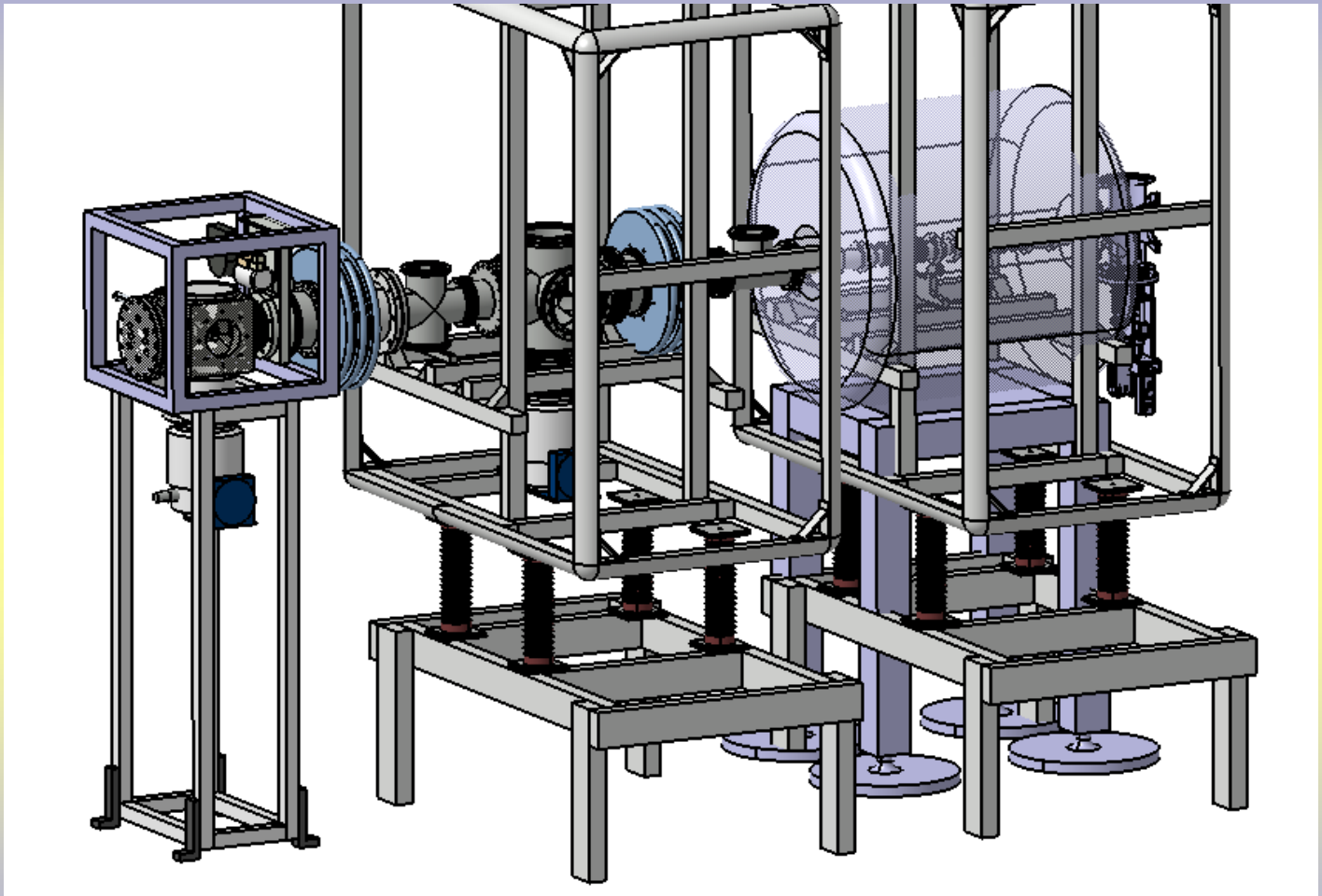
Double Penning-trap system for trap assisted decay spectroscopy



System to produce ultra pure samples for

- **high-precision measurements (e.g. 0+ → 0+)**
- **other measurements which need pure samples (e.g. TAS)**

System characteristics

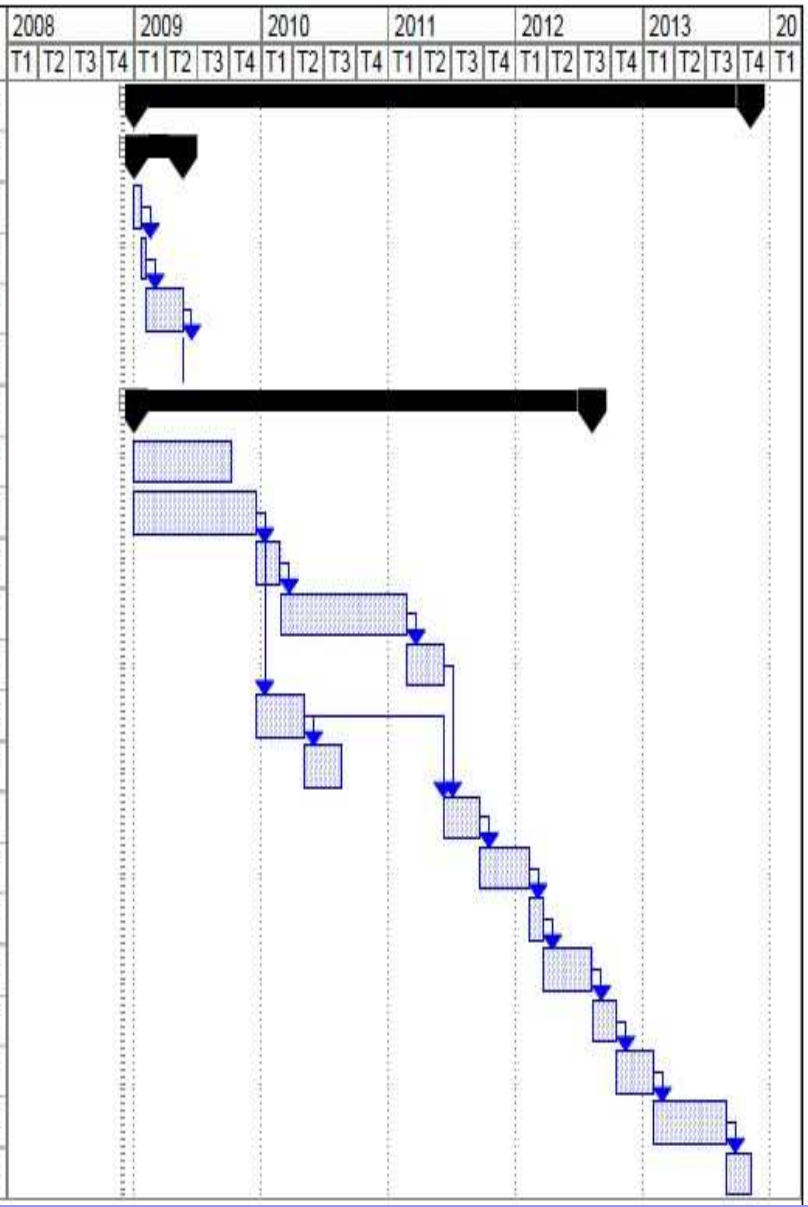
- **fast separation (below 100 ms)**
- **sufficiently high resolving power (M/DM > 10^5)**
- **high capacity (up to 10^6 singly-charged ions)**
- **high transmission (> 30%)**
- **storage capacity**

Consumptions etc.

electric power: 400V	20 kW
electric power: 230V	50 kW
cooling power	5 kW
liquid helium	1500 l / year (i.e. 5 x 300 l)
liquid helium recovery system	
liquid nitrogen	3000 l / year (30 x 100 l)
nitrogen gas	yes
decarbonised water	
demineralized water	50 l / h at 26° for pumps
standard water	
compressed air	6-8 bars for valves
power maintainance	desirable
weight of setup	3 t
specific weight	1000 kg/m2
floor size	5 x 5 m2
max height	4.5 m
others:	entrance gate: 4 x 4 m2
	crane: 5 t
	air conditioning: +/- 1°
	ethernet
	optical alignment possibilities
	pump exhaust sytem

A possible schedule

N°	Name of task	Duration	Start	End
1	1 TRAPSPEC	1265 jours	Ven 02/01/09	Jeu 07/11/13
2	1.1 Stable-ion source	101 jours	Ven 02/01/09	Ven 22/05/09
3	1.1.1 Definition of ion source	15 jours	Ven 02/01/09	Jeu 22/01/09
4	1.1.2 Purchase of ion source	10 jours	Ven 23/01/09	Jeu 05/02/09
5	1.1.3 Installation of ion-source ensemble	75 jours	Ven 06/02/09	Jeu 21/05/09
6	1.1.4 First beam of ion source	1 jour	Ven 22/05/09	Ven 22/05/09
7	1.2 Double Penning trap system	940 jours	Ven 02/01/09	Jeu 09/08/12
8	1.2.1 Beam optics studies	200 jours	Ven 02/01/09	Jeu 08/10/09
9	1.2.2 Detailed mechanical design studies	250 jours	Ven 02/01/09	Jeu 17/12/09
10	1.2.3 Ordering of superconducting magnet	50 jours	Ven 18/12/09	Jeu 25/02/10
11	1.2.4 Delivery delay of magnet	260 jours	Ven 26/02/10	Jeu 24/02/11
12	1.2.5 Installation and start up of magnet	75 jours	Ven 25/02/11	Jeu 09/06/11
13	1.2.6 Manufacturing of Penning traps	100 jours	Ven 18/12/09	Jeu 06/05/10
14	1.2.7 Assembly of Penning traps	75 jours	Ven 07/05/10	Jeu 19/08/10
15	1.2.8 Assembly of traps and magnet	75 jours	Ven 10/06/11	Jeu 22/09/11
16	1.2.9 Test and optimisation of trap ensemble	100 jours	Ven 23/09/11	Jeu 09/02/12
17	1.2.10 First beam out of Penning traps	30 jours	Ven 10/02/12	Jeu 22/03/12
18	1.2.11 Optimisation of whole system	100 jours	Ven 23/03/12	Jeu 09/08/12
19	1.3 Dismounting and transport to GANIL	50 jours	Ven 10/08/12	Jeu 18/10/12
20	1.4 Installation at DESIR at GANIL	75 jours	Ven 19/10/12	Jeu 31/01/13
21	1.5 Optimisation of whole system	150 jours	Ven 01/02/13	Jeu 29/08/13
22	1.6 First on-line experiment	50 jours	Ven 30/08/13	Jeu 07/11/13



Cost estimates

Investment:	
- Penning trap system	**600000 €**
- control system	**50000 €**
- general equipment	**75000 €**
- detection	**30000 €**
Manpower cost:	
- personnel	**6 man years (180000 €)**
Travel and indirect costs:	**190000 €**

Could be financed by ANR and Region Aquitaine