

Objectives and means of France HADRON in terms of facilities and beam access.

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France HADRON is a proposal for a unique national institution made of 5 centers

- **A national infrastructure distributed on 5 nodes :**
 - ETOILE Center in Lyon, [**Carbon**]
 - ARCHADE Center in Caen, [**Carbon**]
 - Centre Antoine Lacassagne / IMPACT in Nice, [**Proton**]
 - Curie Institute / ICPO in Orsay, [**Proton**]
 - Claudius Regaud Institute / PERICLES in Toulouse. [**Proton**]
- **with the partnership of CNRS/IN2P3 (IPNL & LPC) and of IRSN,**
- **and the support of INSERM, INCa, CEA, ENLIGHT, ULICE and 16 industrials and public institutions including CNES, Thales, Mérieux, AREVA, ...**

France HADRON - objectives

- To federate research teams and organize research at a national level,
- To fund beam time and beam line access for research.
- To open new research beam lines for protons and carbon ions, to increase available beam time
- To optimize technical means and procedure for hadrontherapy,
- To organize training in the frame of the European programs
- To have a positive input on economy

France HADRON – scientific project (1)

- **Multidisciplinary:** medicine, physics, biology, computer, etc.
- **25 teams are involved :**
 - **Lyon - Clermont-Fd :** teams of C. Rodriguez-Lafrasse, M. Beuve, D. Dauvergne, G Montarou, N. Foray, D. Sarrut, B. Shariat, B. Ribba, P. Pommier.
 - **Nice :** teams of JM. Hannoun-Levi, P. Mandrillon.
 - **Orsay :** teams of A. Fourquet / R. Dendale, A. Mazal, J. Hall / F. Pouzoulet.
 - **Caen :** teams of D Cussol / J. Colin, M. Bernaudin, K. Boumediène, JL. Lefaix, MH. Moscatello, JL. Habrand.
 - **Toulouse :** teams of E. Moyal, P. Celsis / A. Laprie / M. Delannes, R. Ferrand

France HADRON – scientific project (2)

- **Organized into four working packages:**
 - **WP1 - How to identify and assess the medical value of hadron therapy (clinical research); Pascal POMMIER (Lyon)**
 - **WP2 - How to improve treatment plans (measurements, modeling and computer simulation); Daniel CUSSOL (Caen)**
 - **WP3 - How to better understand the effect of treatment (radiation biology, radiotoxicology); Claire RODRIGUEZ-LAFRASSE (Lyon)**
 - **WP4 - How to improve the quality control of treatment (instrumentation); Denis DAUVERGNE (Lyon).**

France HADRON – scientific project (3)



France HADRON: Beam time request/year with no adjustment to availability, the first 3 years

WP	proton	carbon
WP1	0	0
WP2.1	0	620
WP2.2	0	0
WP2.3	0	0
WP2.4	0	0
WP3.1	17	17
WP3.2	60	150
WP3.3	267	120
WP4.1	108	125
WP4.2	80	0
WP4.3	50	70
WP4.4	0	0
Total needs (h)	582	1102

Potentially and really funded beam time the first three years		
WP	proton	carbon
WP1	0	0
WP2	0	221
WP3	122	102
WP4	85	70
Total extended time	207	393
Total funded time	138	262



Expected grouping rate: 1,5 (possibility to pool some beam time allocation for different experimental programs).

Average Max beam time cost per hour: **875 € TTC^[1]**

Overall annual budget allocated to beam time: **340 k€**

Beam time funded per year : \approx 400 hours

^[1] GANIL hour of carbon beam is 750€ HT; ESA is paying 670€HT the hour of proton beam on a commercial base ; TVA21%

Remarks

- Beam time access is necessary
- But beam without a research « environment » is useless
- Beam time at its « real cost » is almost inaccessible for research teams.
- *So an offer should integrate beam access and scientific support for a low cost.*