



Progress report on Bordeaux high energy lasers

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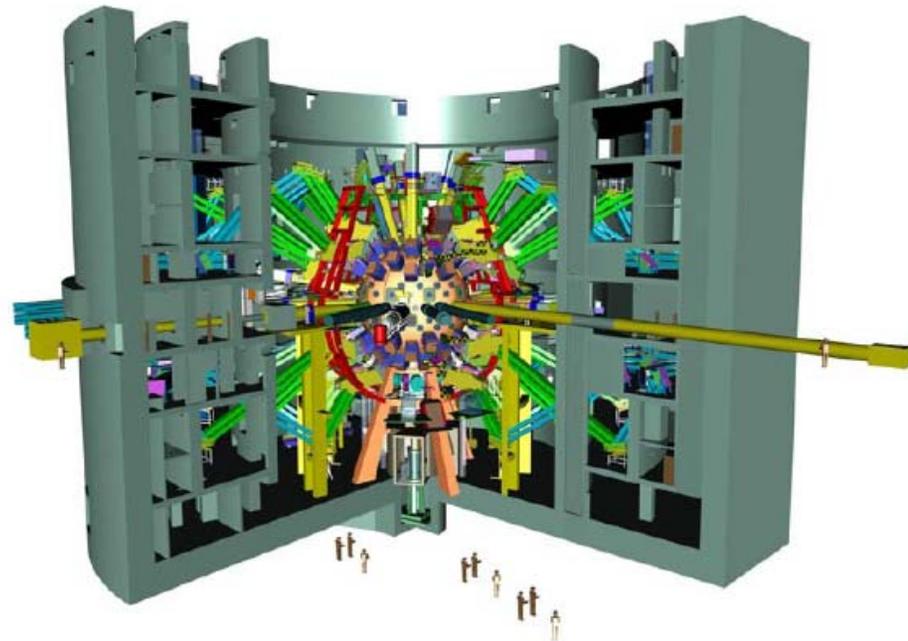
Reminder on LMJ

Total energy > 1 MJ

160 compression laser beams + 16 diagnostic beams

To be commissioned in 2014-2015

Open to academic community on 20% basis



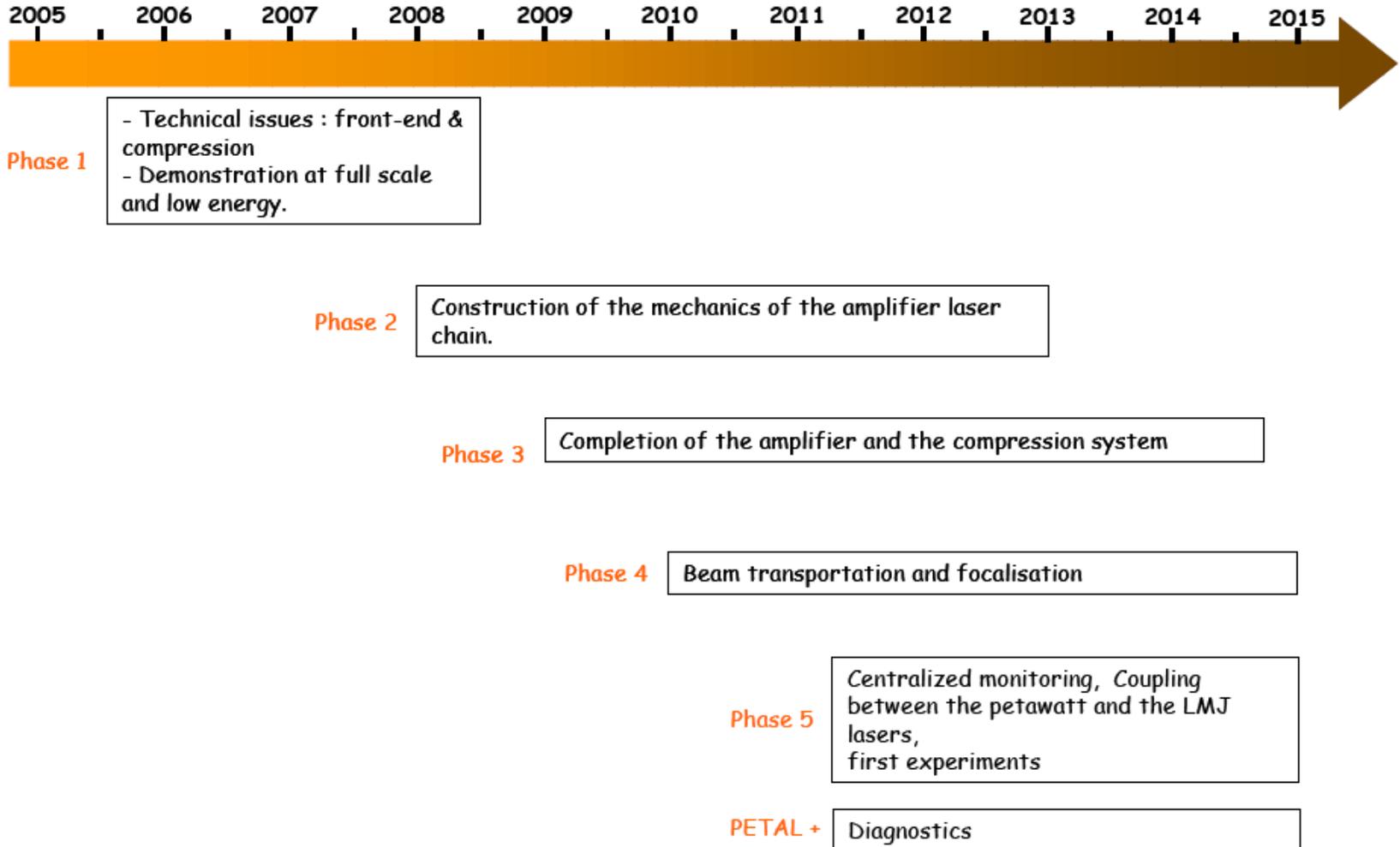


Status of the PETAL project

- Reminder : 6 PW laser, 600 fs, 3.6 kJ
- Project launched in 2003, to be coupled to octaLIL.
- Total laser cost : around 55 M€
- New decision : **PETAL transferred to LMJ**
 - Project commissioning delayed until 2015
 - Opens new science opportunities, especially in view of the **HiPER** program
- Chief Scientist : *Prof. H. Hutchinson*



PETAL new time line





PETAL plasma diagnostics :

- Thorough reflections within ILP on the most useful diagnostics
- Project submitted to the French « EquipEx » call

1. Two Inserters for specific diagnostics

2. Proton Spectrometer

3. Electron Spectrometer

4. Large range X-Ray counting Spectrometer

Few additional diagnostics required :

- Broadband Xray spectrometer for bremsstrahlung characterization
- 2D Xray imager for radiography
- High resolution Xray spectrometer



Smaller scale HED lasers :

- **ALISE** laser within CEA/CESTA was decommissioned recently
- New **LEA project**

Needs expressed by users (LaserLab/ILP workshop):

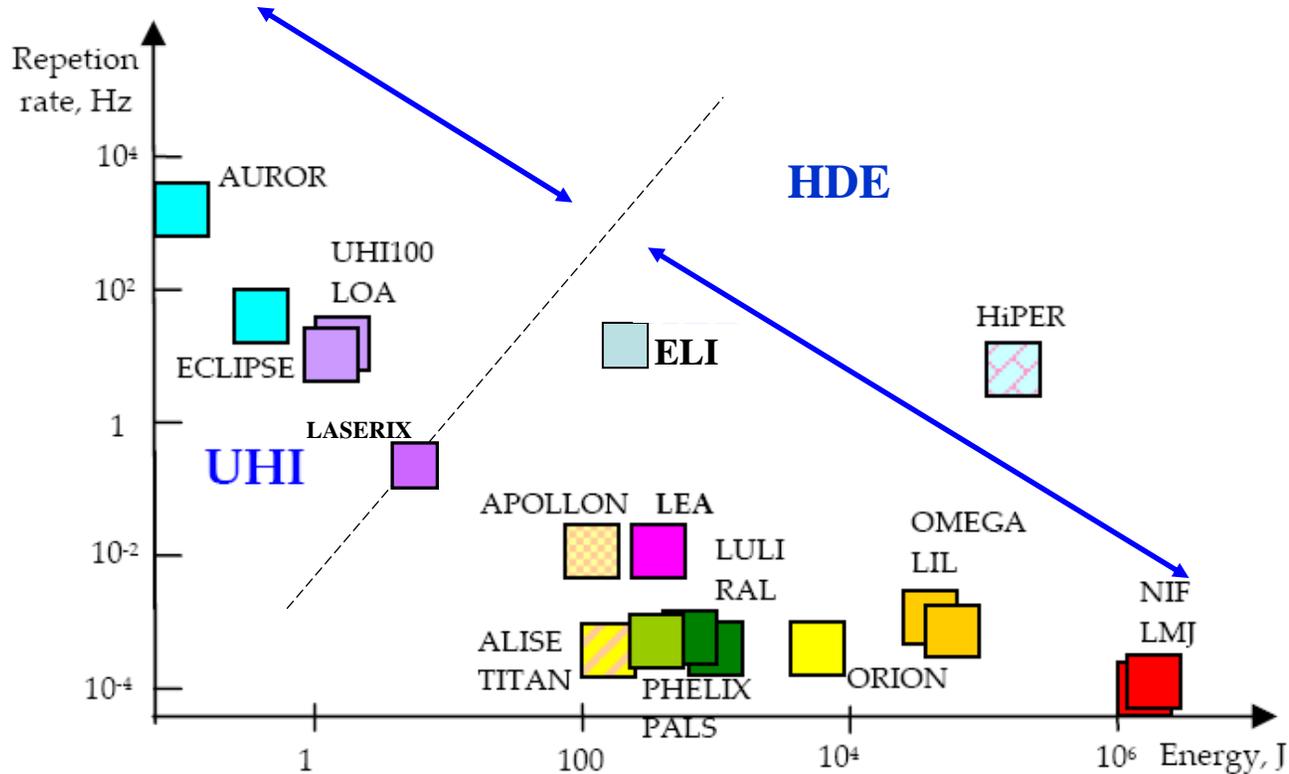
- 1. Multi-kJ facility (Omega-type) → ???**
- 2. Beam time, even on smaller scale facilities, but versatile**

Regular feedback : increase the repetition rate.

*Opportunity opened by **ELI & Apollon** programs :*

- Commercial solutions for several 100J, 1 μ m, 1 shot/minute
- Flash-lamp solutions → not sexy, but cost effective!!
- Spatial quality sufficient for ns HED laser (with RPP)

Technology convergence between UHI and HED lasers

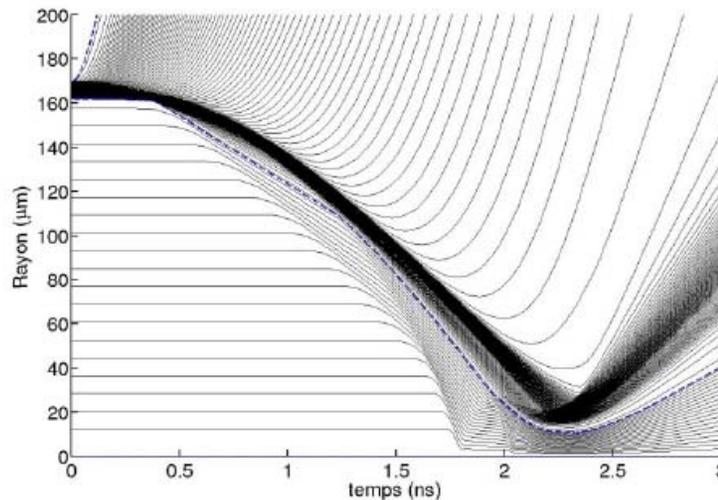


Scientific opportunity of low-high energy lasers :
Possibility to implement spherical irradiation geometry

Hints of the science case

At 100 J level : laser-induced shocks, jets, atomic physics, optical damage...

At 400 J level (2015): hydrodynamics, laser instabilities, compression for ICF physics (shock ignition)



High compression allowed by spherical geometry

Possibility : towards several kJ (beyond 2020)



in a nutshell...

- **Coupled LMJ/PETAL, open to academic users, with dedicated plasma diagnostics → science opportunities**
- **First experiments postponed to 2015**
- **ALISE decommissioned**
- **New opportunities (UHI/HED tech convergence):**
 - **« High » rep rate HED lasers (1 shot/minute, few mn)**
 - **Versatile geometries, including cylindrical/spherical**
- **Need for continued cooperation between five european HED laser players : Prague IPP, RAL, GSI, LULI, Bordeaux**
- **HED lasers upgrades or renewal necessary for HED physics and HiPER project**