

KALDERA

Beschleuniger Betriebsseminar 2020

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DESY

Warum

DESY2030:

„Demonstrate usability of these
extremely compact accelerators...”

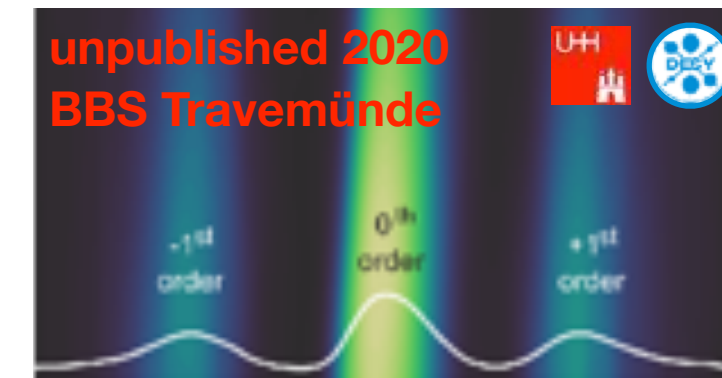
LUX Laser-Plasma Accelerator

Merge Plasma Acceleration and Modern Accelerator Technology

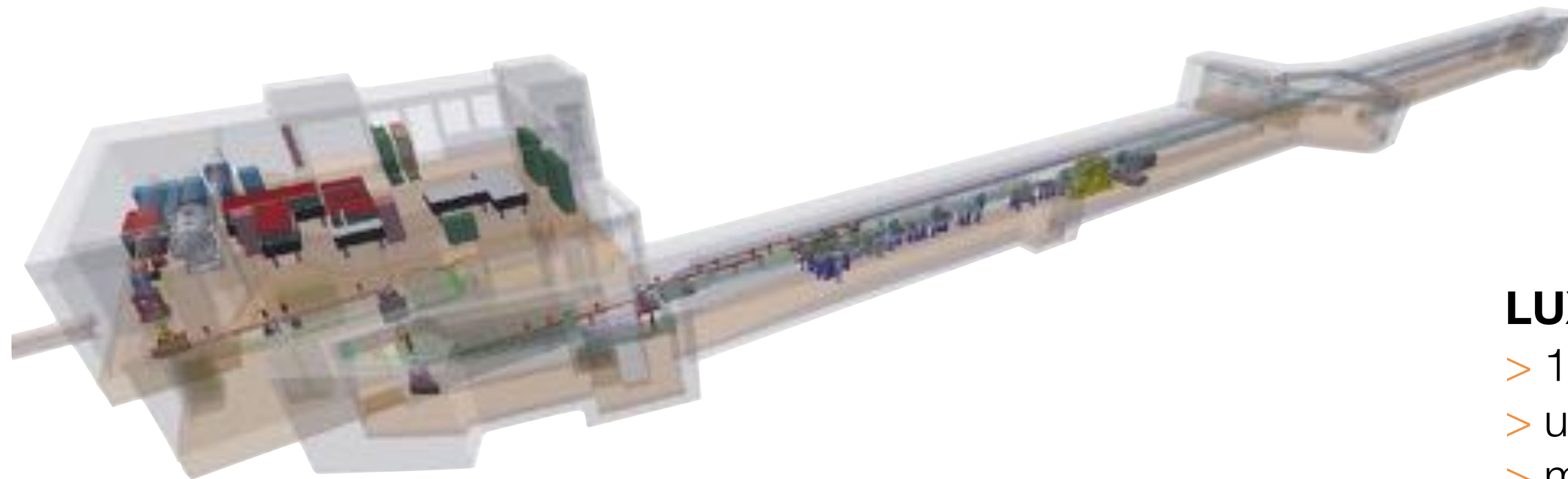
ANGUS
laser



Plasma electrons
~400 MeV @ 1 Hz



Undulator radiation
few-nm spontaneous emission

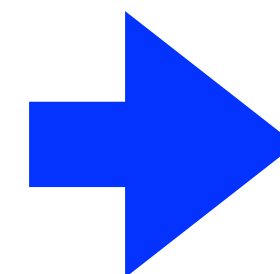


LUX laser plasma accelerator

- > 100 TW @ 1Hz Ti:Sa drive laser
- > uses modern accelerator technology
- > mission: focus on stable beams

LUX Laser-Plasma Accelerator

The State-Of-The-Art



How can we turn LPA into a technology
to drive real-world applications?

High Average Power LPA

1. Feedback
2. Competitiveness
3. Demonstrator

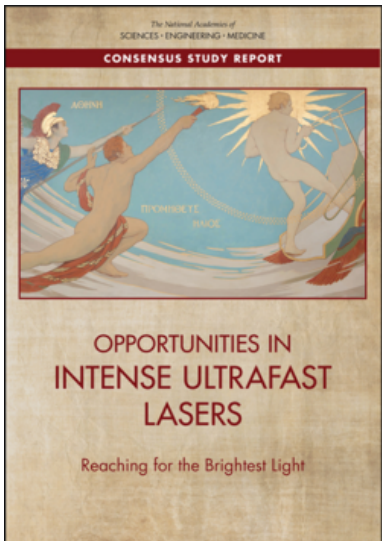
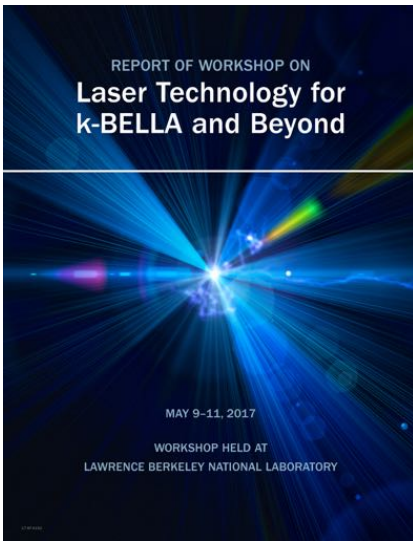
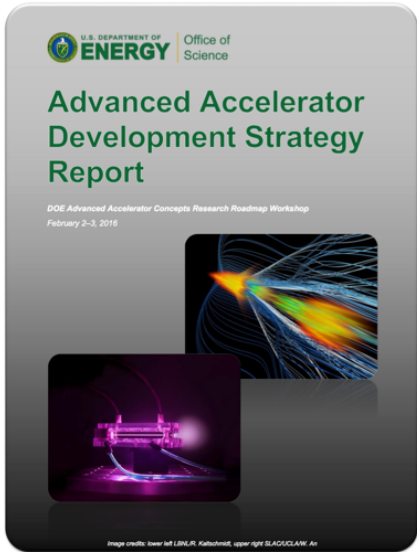
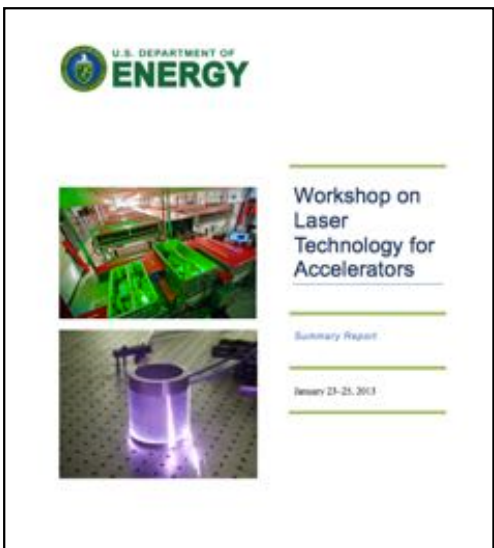
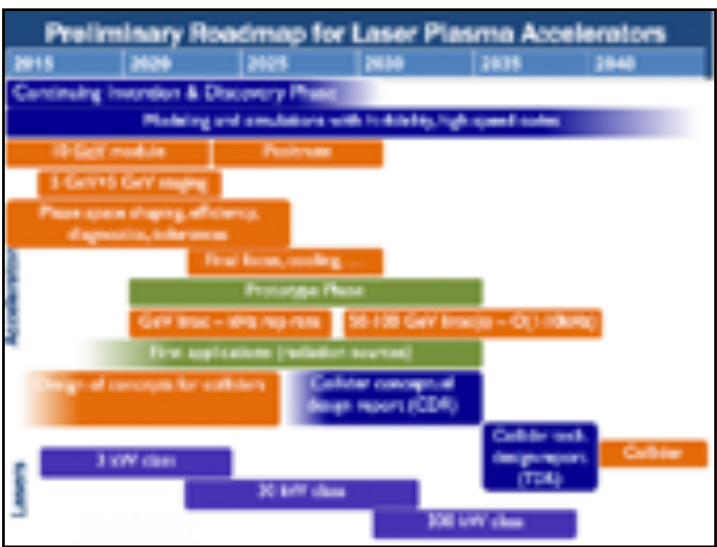
High Average Power LPA

1. Feedback *crucial ingredient for all of our modern accelerators*
2. Competitiveness *because existing technology operates at kHz rep rates*
3. Demonstrator *because we need to justify investments and create confidence that LPA can drive real-world applications*

Was

Was

Based on a Community Consensus





KALDERA

Laser:

- > 3 J in 30 fs on target (100 TW / ANGUS Class)
- > 1 kHz repetition rate

Laser-Plasma Electrons:

- > Sub-percent energy stability
- > Sub-percent energy spread
- > FEL-suitable current and energies

KALDERA
Wim's initiative



**Funding approved by
Stiftungsrat Dec. 2019**

KALDERA

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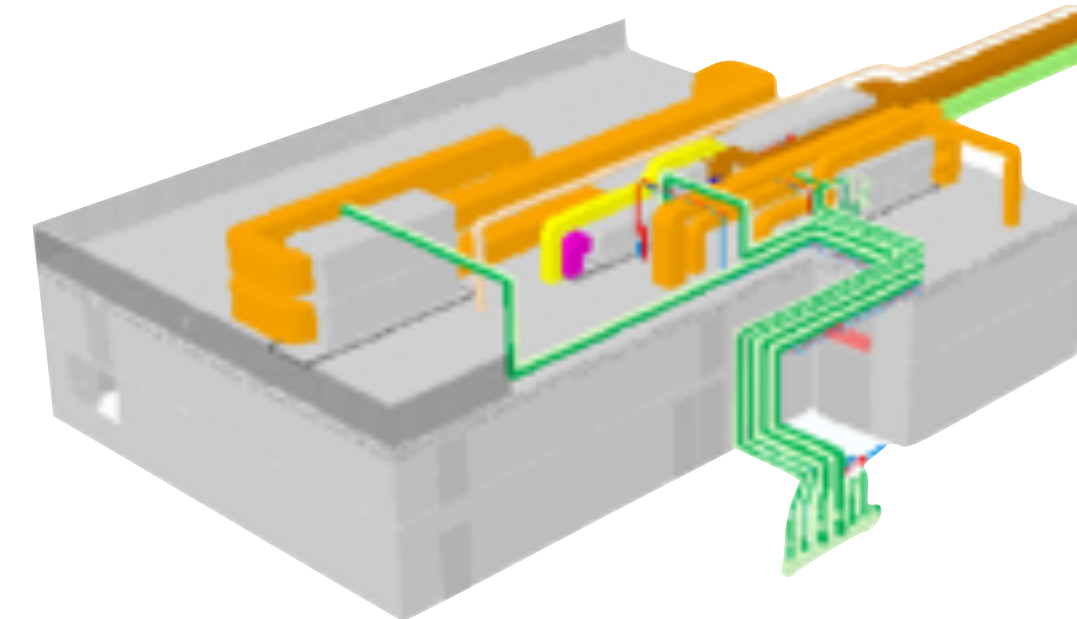
KALDERA Laser Lab

Dedicated 400 m² clean room by Q3/2020

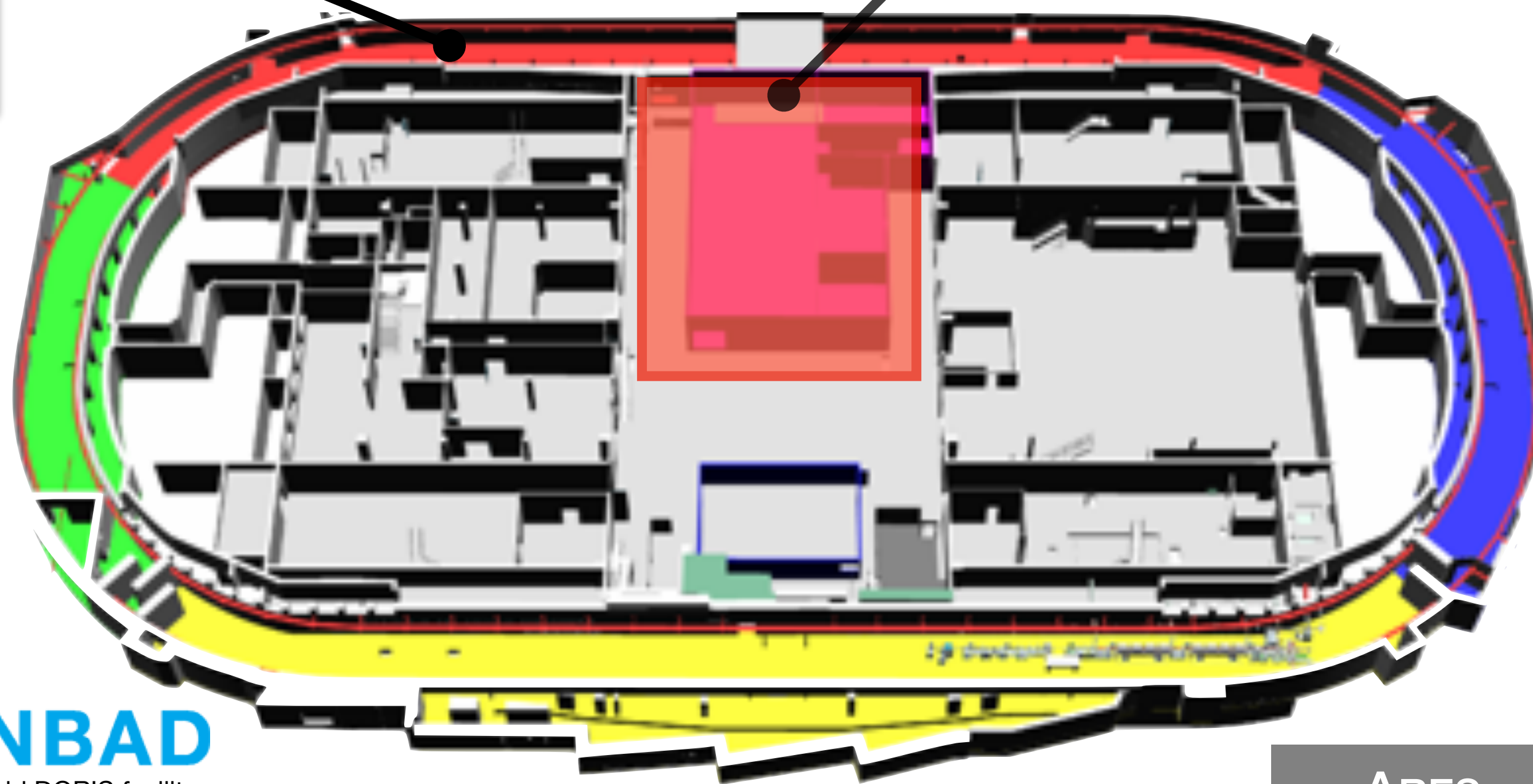


kHz-Plasma Accelerator

KALDERA Laser Lab



AXSIS



ARES

KALDERA Laser Lab

Dedicated 400 m² clean room by Q3/2020



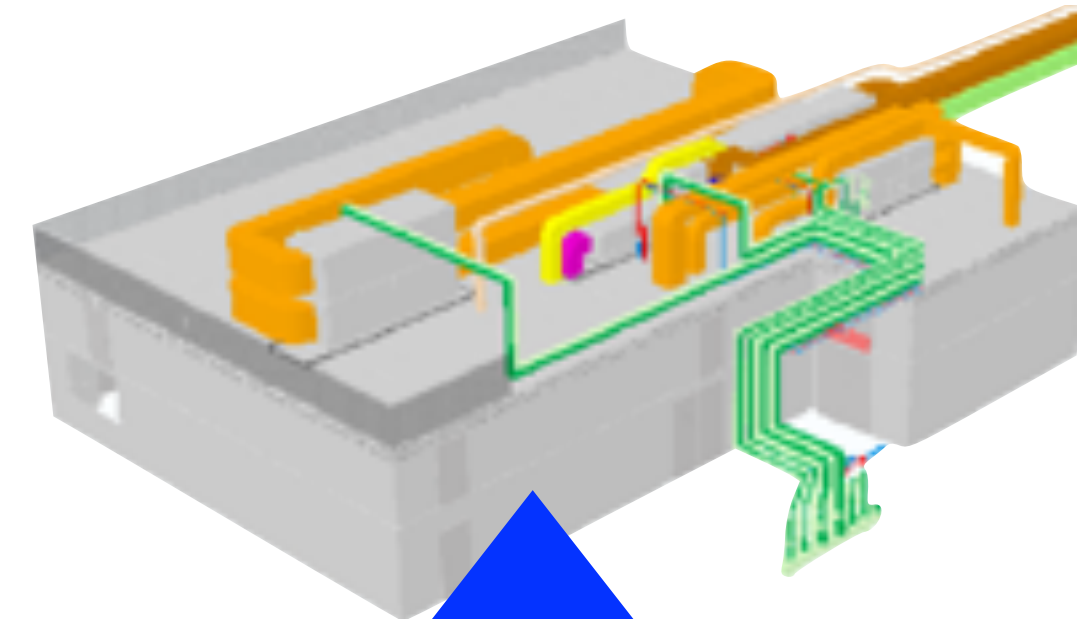
kHz-Plasma Accelerator



KALDERA kHz plasma electrons

„LUX @ 1000 Hz“

KALDERA Laser Lab



KALDERA Laser

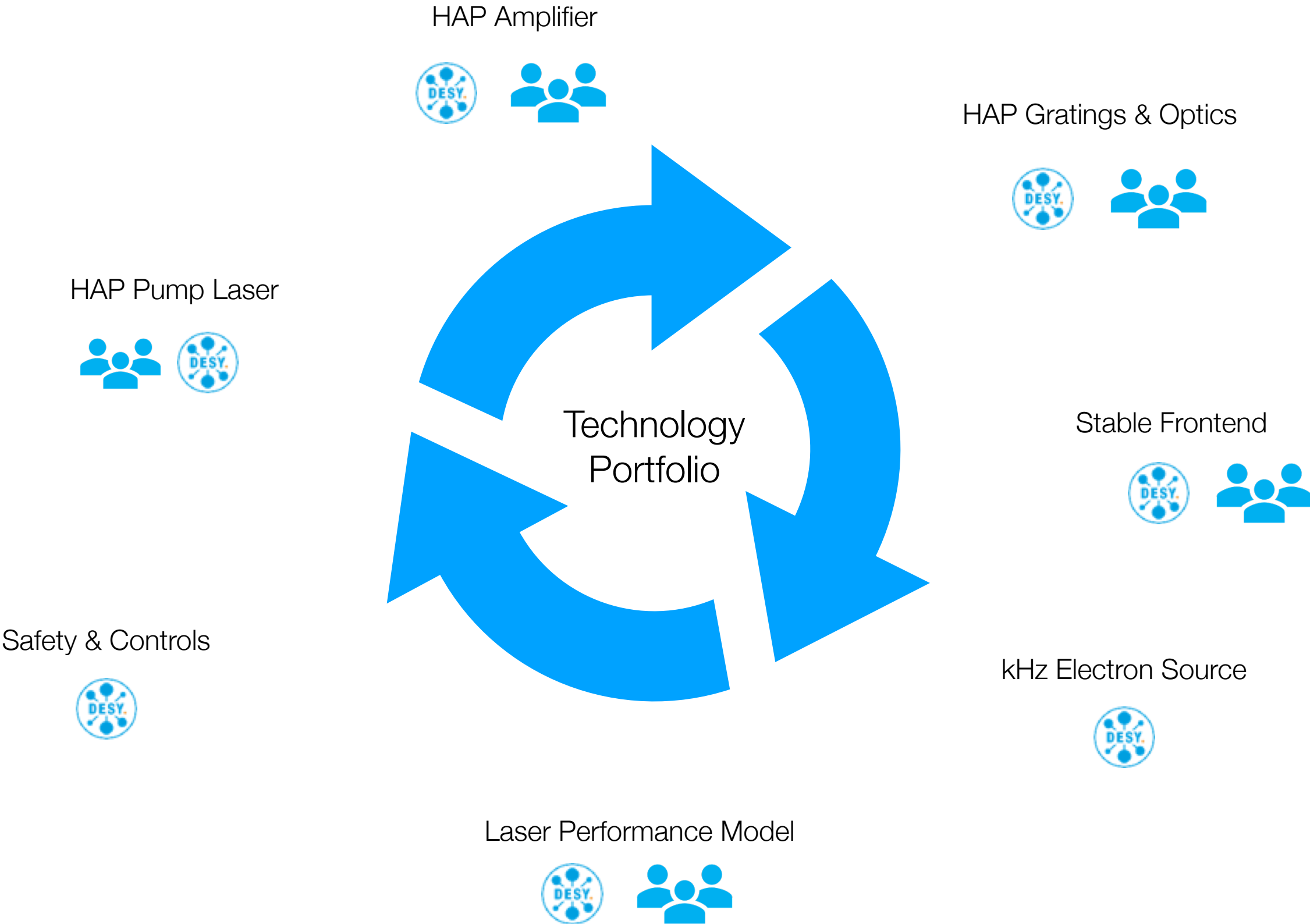
„ANGUS @ 1000 Hz“



Wie

Technology Choice

Team up with Partners



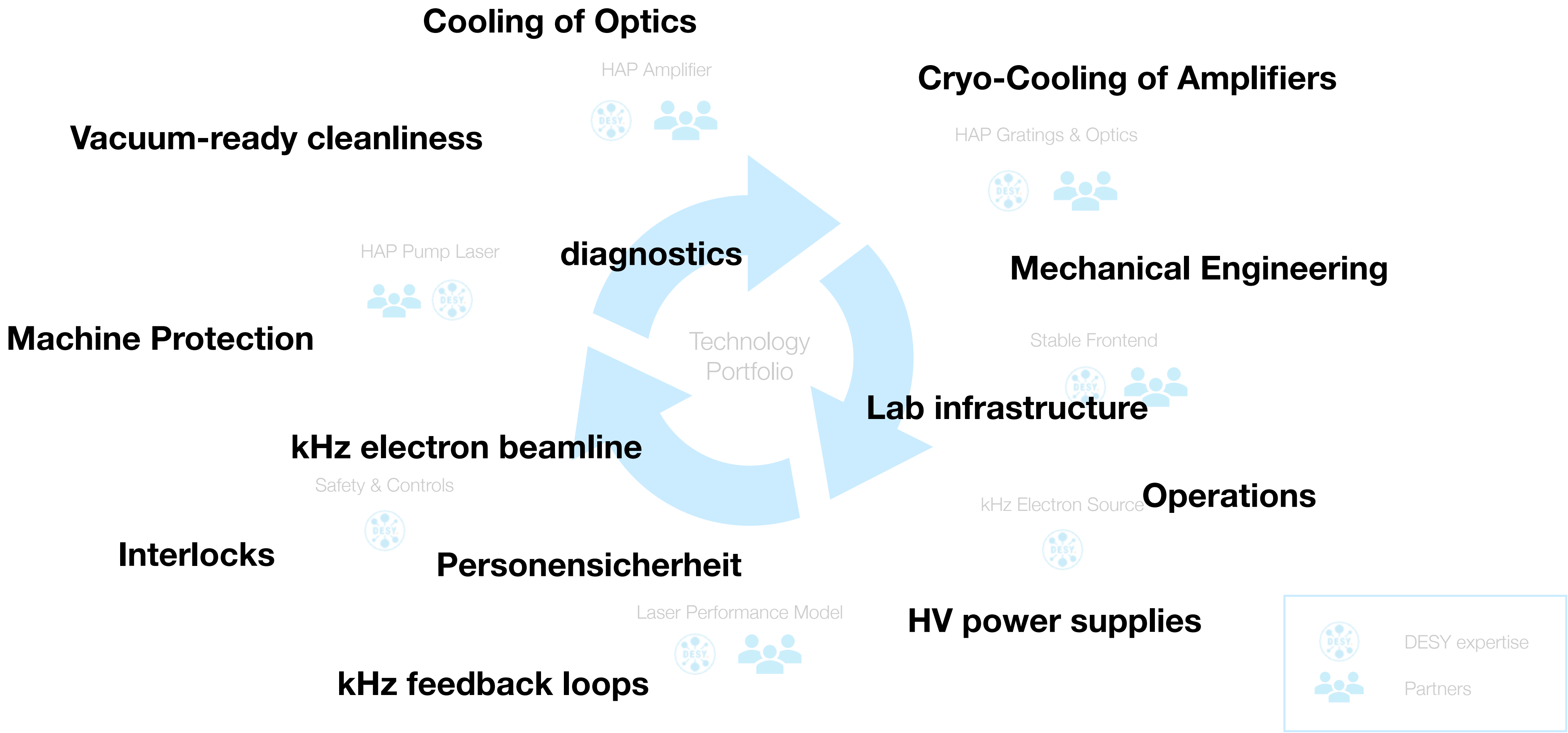
DESY expertise

Partners



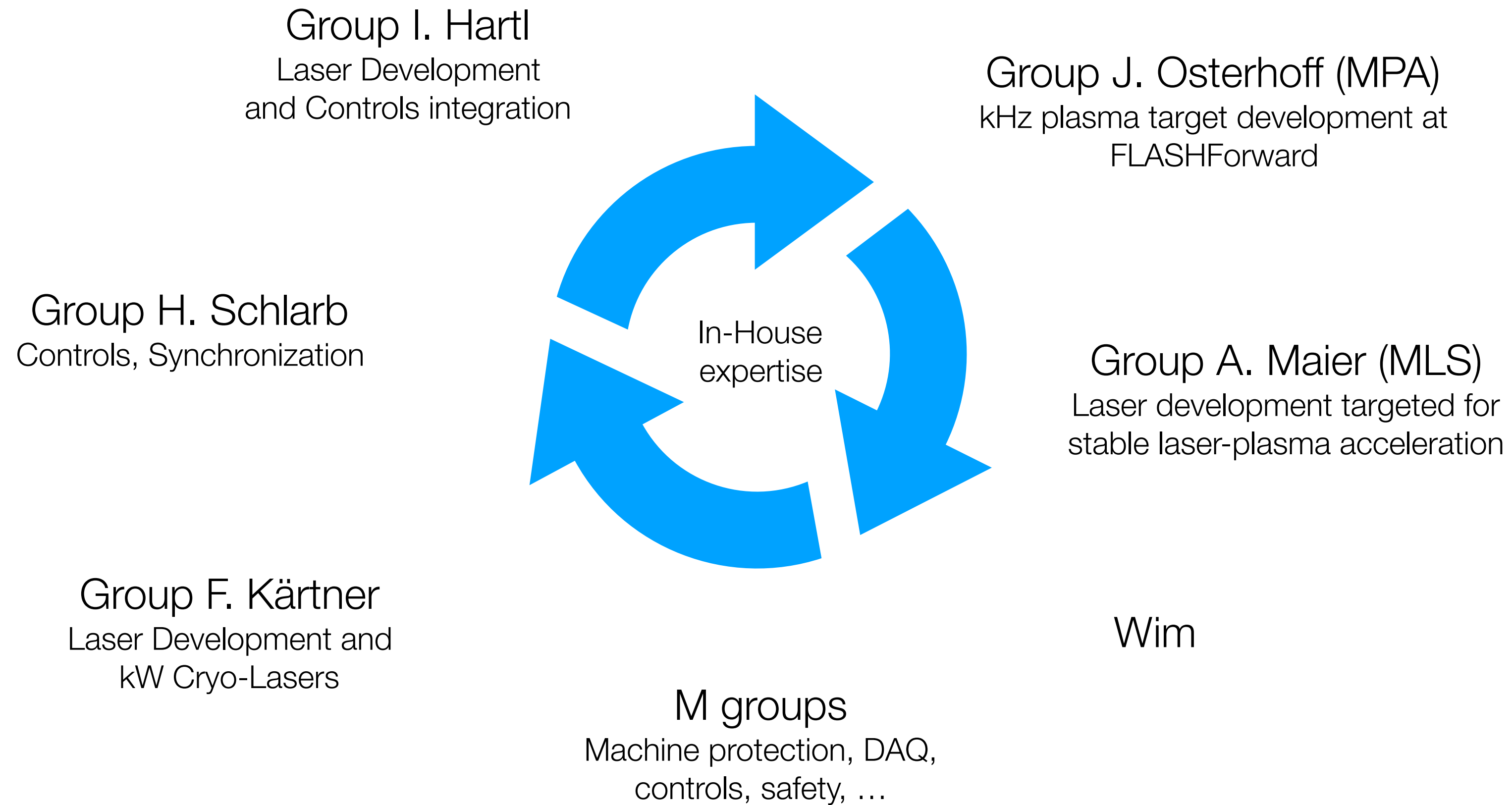
Technology Choice

In-House Expertise



DESY Groups

In-House Expertise



DESY's Stärke

Stabile Beschleuniger für Anwendungen

- > KALDERA hat ein Ziel: Plasma Elektronen für Anwendungen.
 - > kHz Plasma Elektronen
 - > Sub-Prozent Energy Spread und Energie Stabilität
- > Dafür werden wir die gesamte Erfahrung von M im Bau und Betrieb von Beschleunigern brauchen.