# Collection system, horn

## (work mainly done by Francis Osswald)

- goals and perspectives
- suppliers and collaborations
- the pulsed power supply
- conclusion and next milestones

# IReS participation in BENE WP4

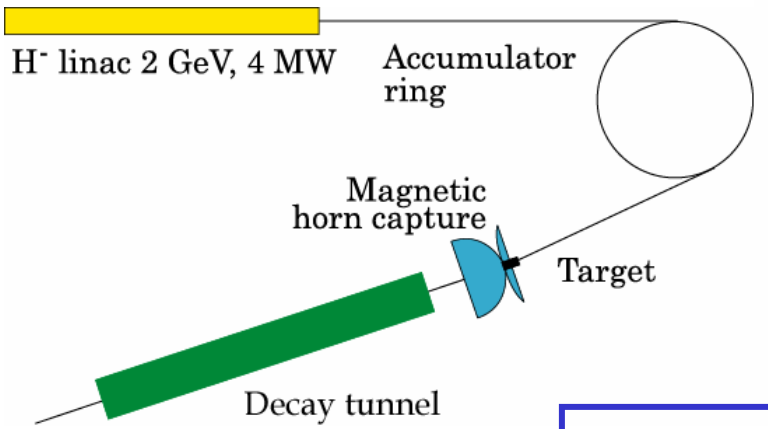
- collaboration with CERN and technology transfer
- install a local test setup transferable to CERN in case is necessary for radiation tests
- develop a pulsed power supply dedicated to this horn
- perform qualification and endurance tests
- develop a simulation tool
- target integration

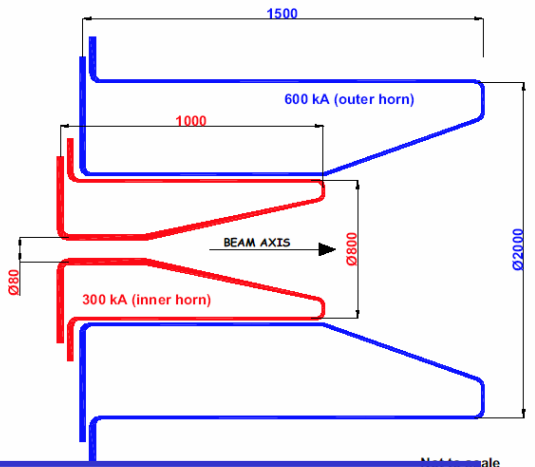
# After discussion with CERN

- Start the collection study for SuperBeam option
- Taking into account previous tests done at CERN, prepare a setup to pulse the horn at 50 Hz (nominal value) and a current as high as possible

CERN horn design

- Proton beam
  - 2.2 GeV
  - 4 MW
  - 50 Hz rep. rate
- Horn focusing
  - First horn 300 kA
  - Reflector 600 kA
- Low energy pion beam: ≈ 500 MeV
  - proton energy below kaon threshold
  - Short decay channel < 100 m
- Low energy neutrino beam: ≈ 250 MeV




tests already done at CERN:
- pulse repetition frequency: 1 Hz
- Imax: 30, 100 kA
- C: 1 mF
- pulse duration: 100 μs

# remaining horn$^{SB}$ issues

| Issue | Status | Competence | Techno-risk | |
|---|---|---|---|---|
| Target integration | To be done | Outsourcing (BENE/WP4) | controlled | |
| Thermo mechanical model @ 4 MW | To be done | IReS | low | |
| Multi physics simulation<br>> fatigue, endurance, transient mode | To be done | IReS | low | |
| Reflector integration | To be done | CERN/IReS | intermediate | |
| Gradual power test up to 300 kA & 50 Hz | To be done | IReS+ISL | (financing) | |
| Endurance test EM/structural mech.<br>(8 $10^8$ pulses) | To be done | IReS | low | |
| Thermo mechanical test (Joule+beam) | To be done | IReS+outsourcing | high | |
| Test with reflector | To be done | IReS/CERN | intermediate | |
| Study of PS energy recovery | To be completed | IReS+ISL+ABB | low | |
| Radiation hardness | To be completed | IReS+outsourcing | intermediate | |

# work in progress since last ISS meeting at KEK

- power supply design : looking for suppliers, collaborations and financing
- infrastructure and team setup
- simulation tool evaluation

# evaluation process

- selection of the suppliers
- evaluation of the competitiveness
- definition of the developments

# actual status

## supply

- charger : Cirtem(Toulouse), Hazemeier(Gauchy), Micronics (Lyon) or Technix (Créteil)
- capacitors : TPC-AVX (F) or Atesys (F)
- switching : ABB (CH)

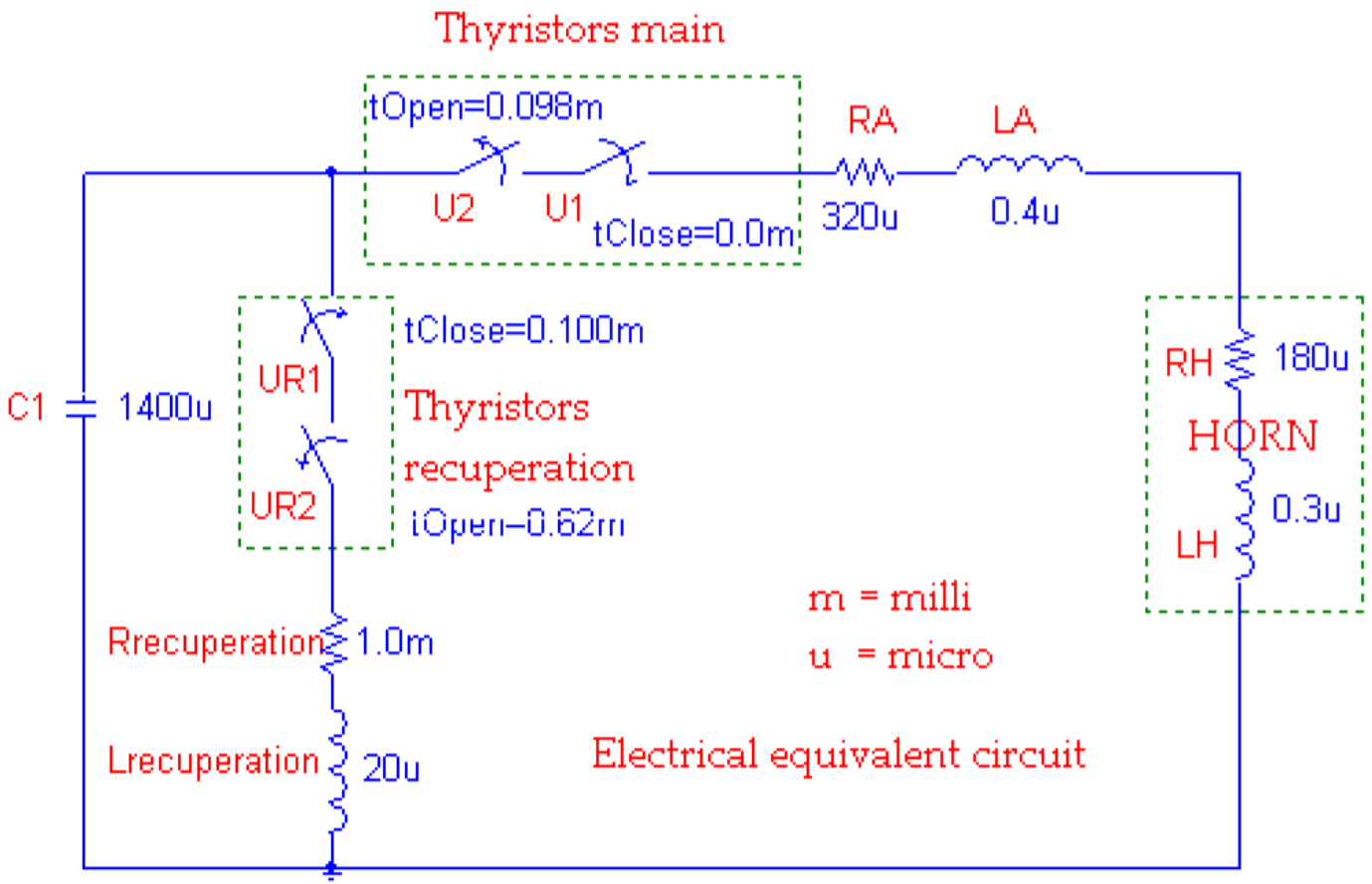
## collaboration

- ISL (St Louis)

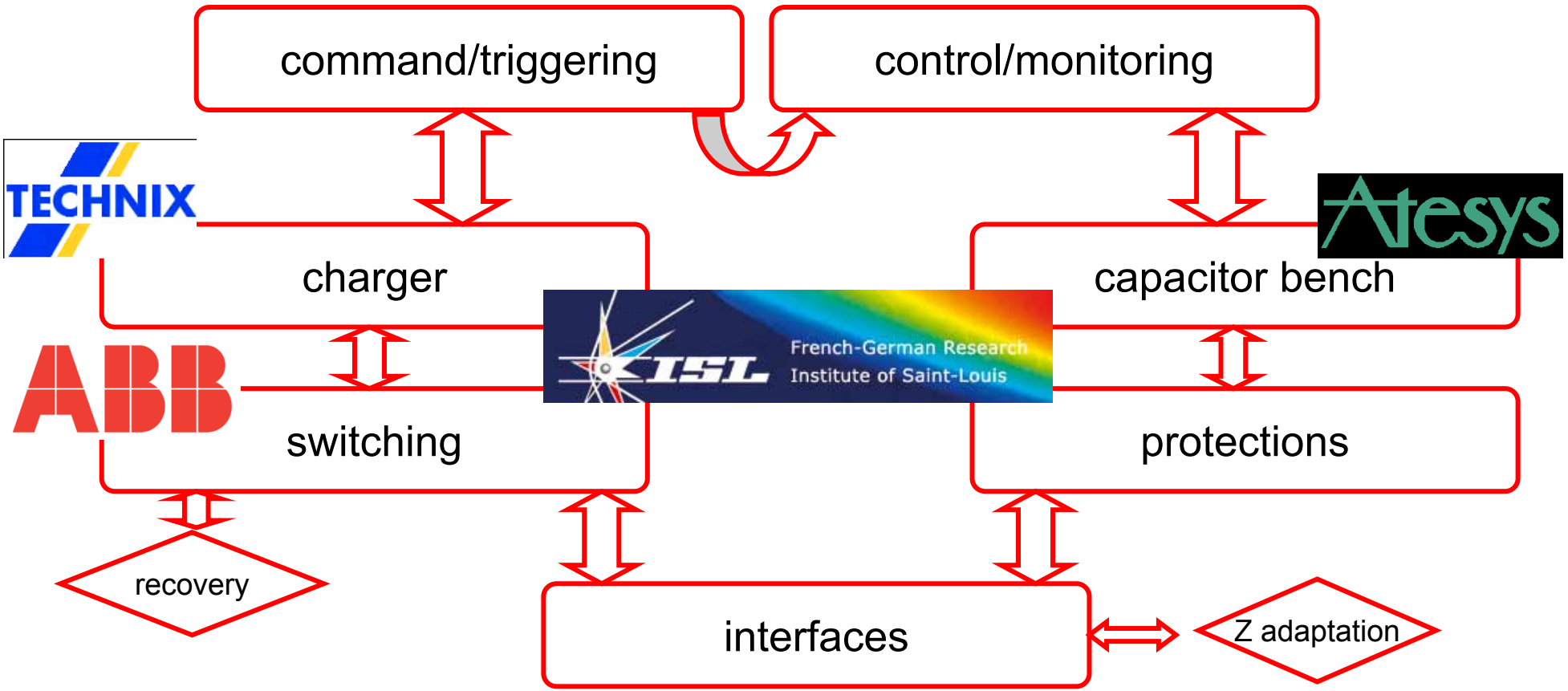
## contacts

- MegaGauss (Berlin)
- LNCMP (Toulouse)

# the power supply



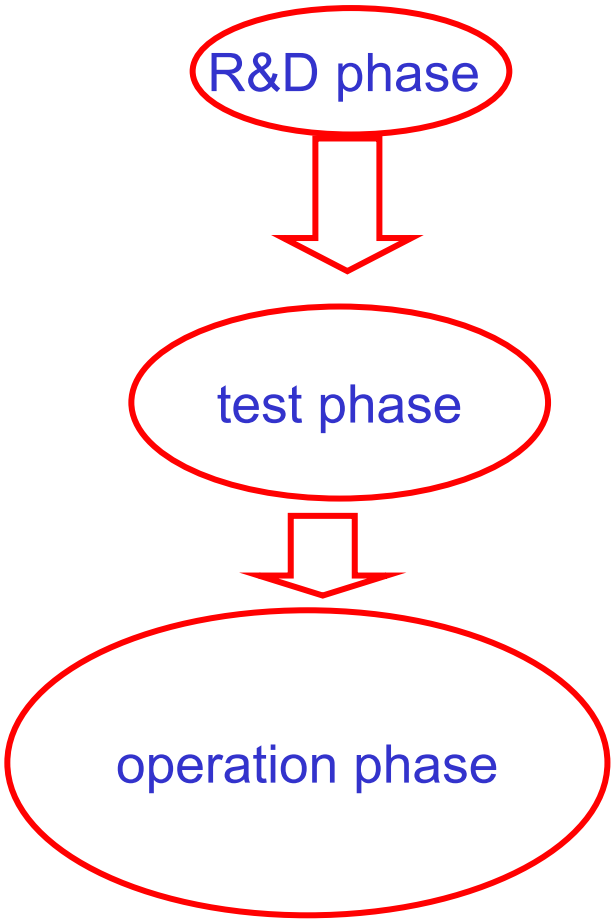
# the power supply



# a modular system enables

- progressive financing
- manage the test setup installation
- preparation and realization of different tests
- investigations with simulation
- high current upgrade @ 50 Hz

# financing




- ANR (Agence Nationale de la Recherche), 2007
- EU (FP7)
- Région Alsace
- CNRS/IN2P3

- EU (FPi)
- CERN

# preliminary schedule

- Design of Power Supply: 2006
- R&D, tests and simulations: 2006-2007
- new prototype: 2008