

Spain@CERN TE-ABT

Etienne Carlier on behalf of TE-ABT group

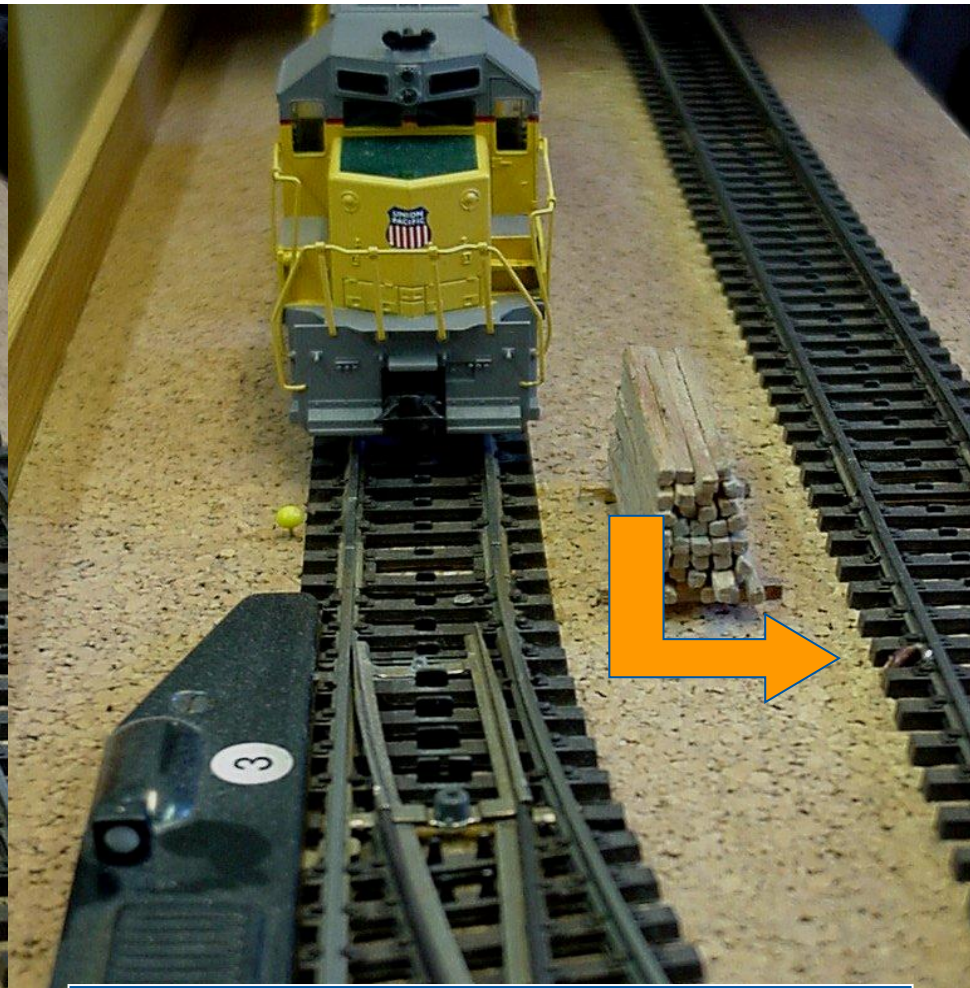
29-10-2014



Group Mandate: Beam Injection and Extraction

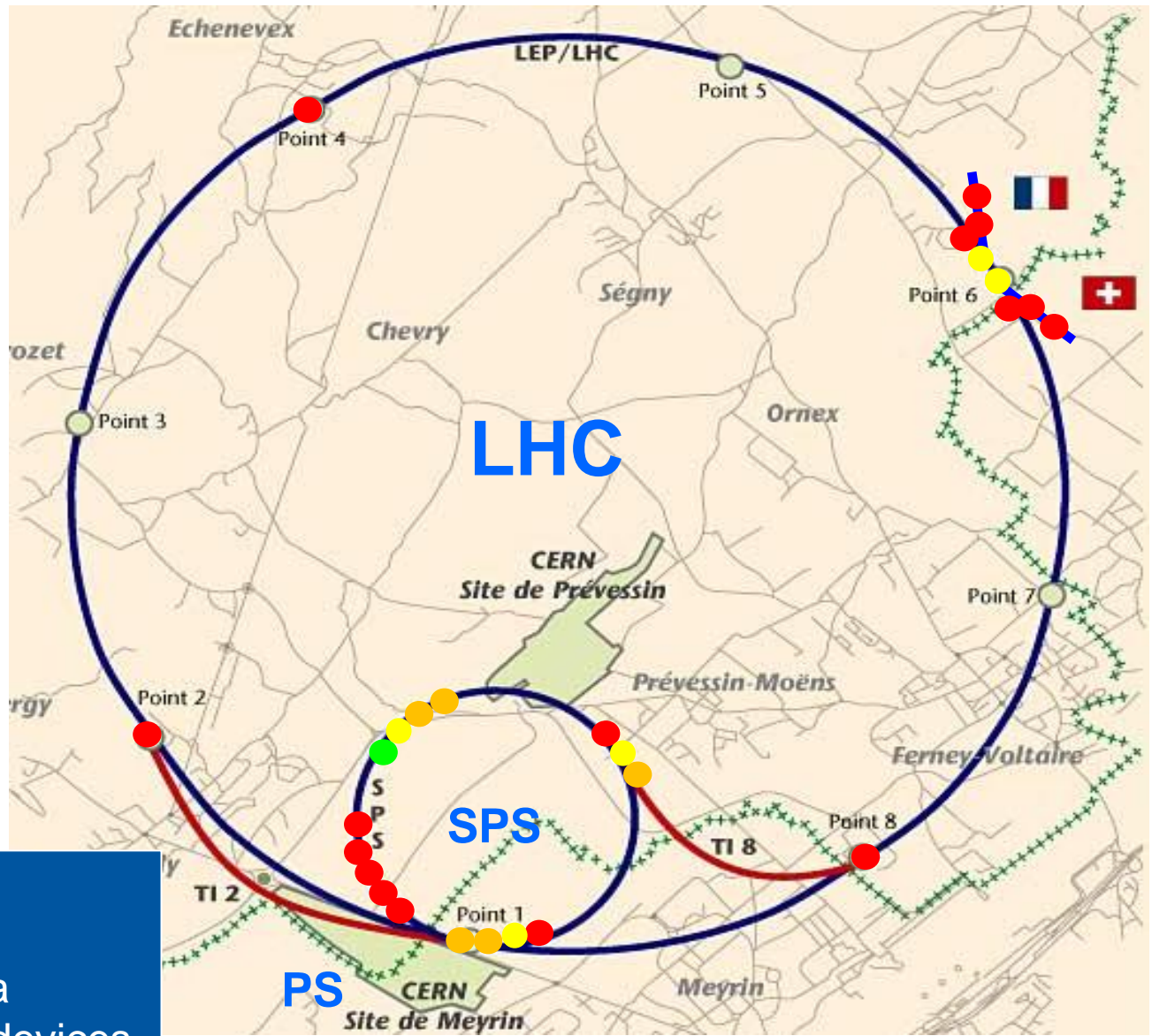


Beam circulating



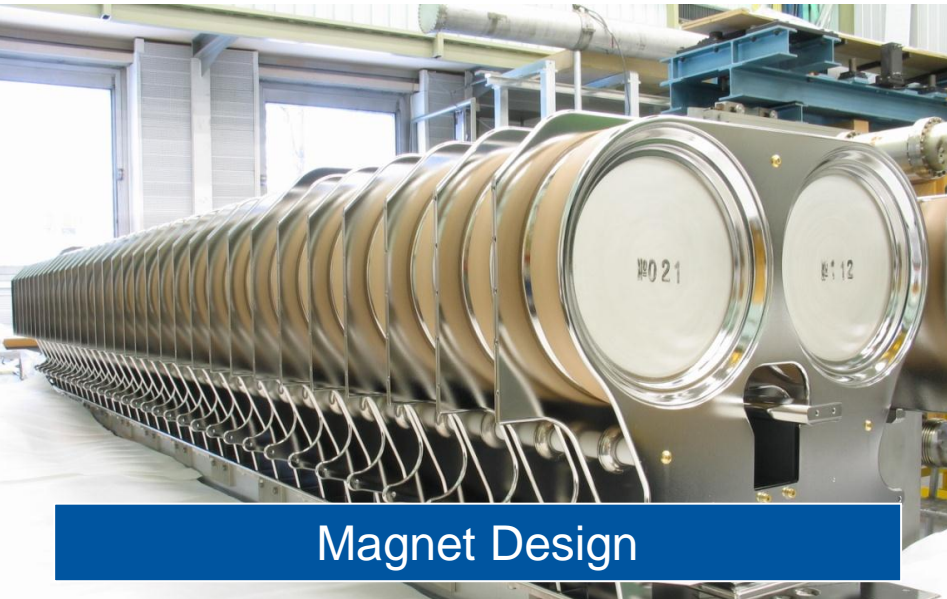
Beam extracted

Like a railway switching... but for a train running at the speed of light

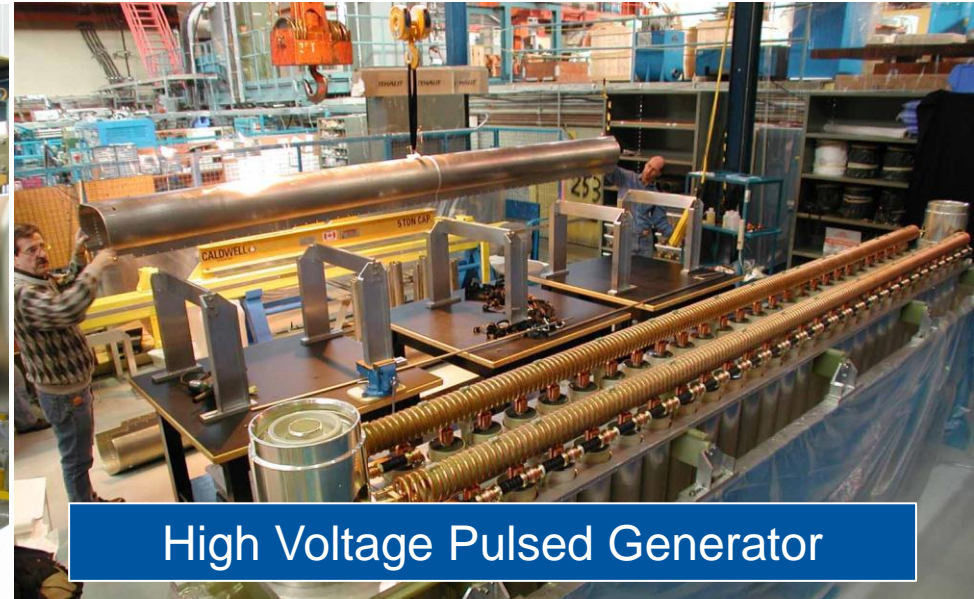


- Fast Pulsed Magnets
- Electrostatic septa
- Electromagnetic septa
- Extraction protection devices

TE-ABT - Competencies



Magnet Design



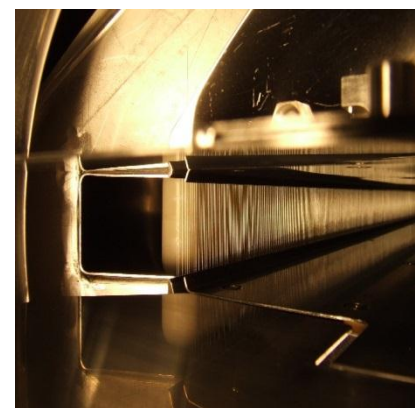
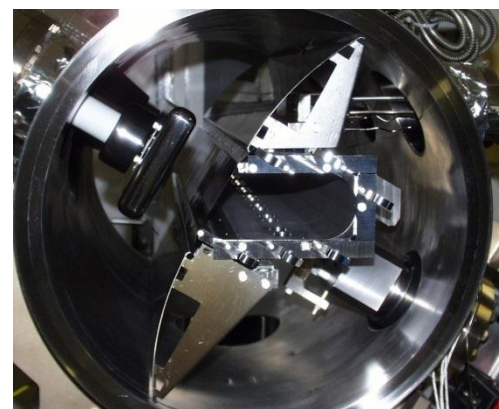
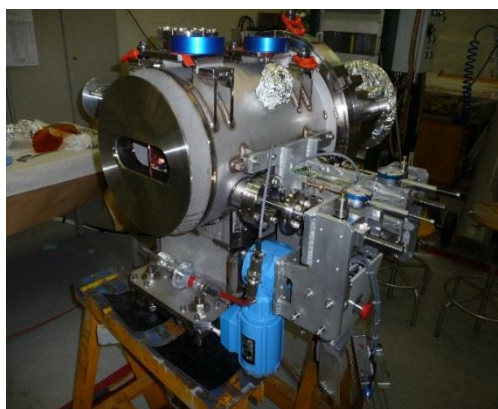
High Voltage Pulsed Generator



Actuators & Sensors

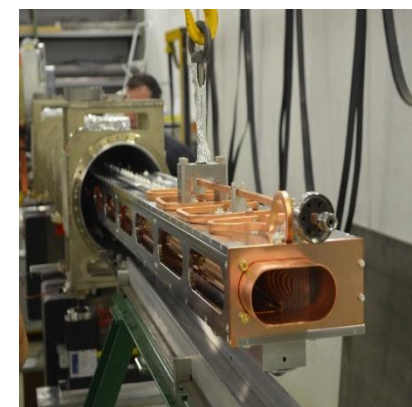
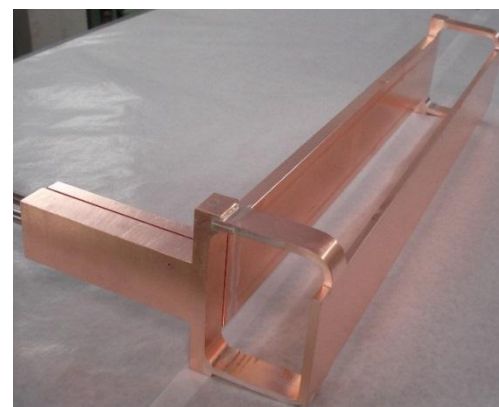
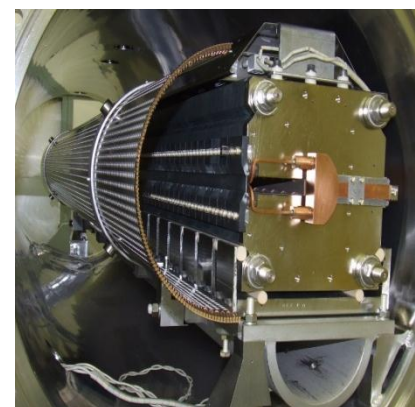
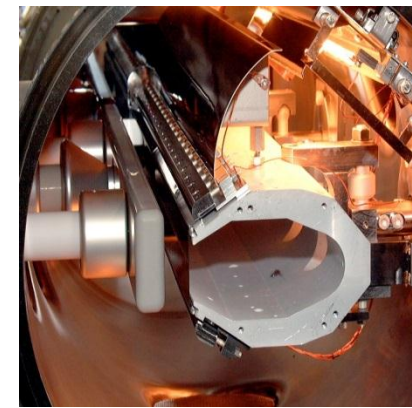


Electronics & Controls

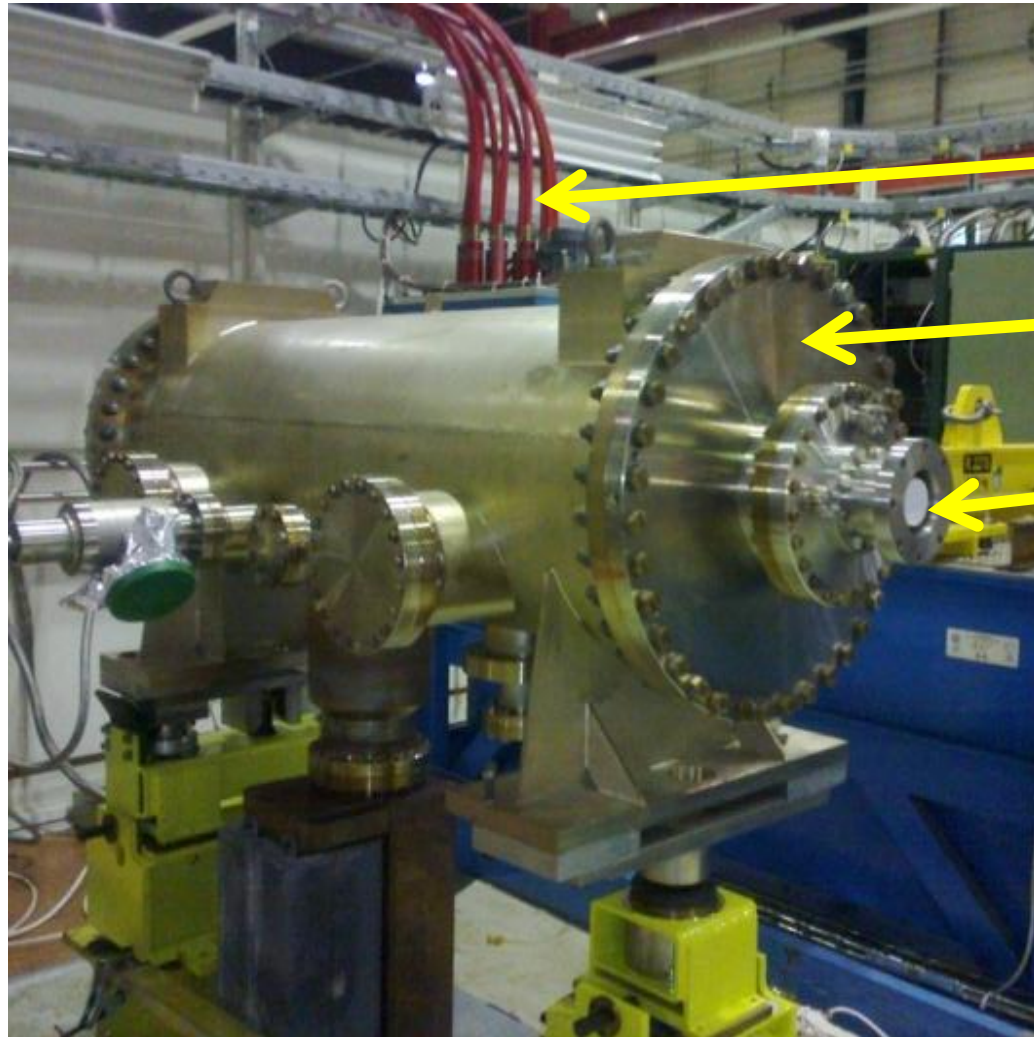


TE/ABT Septa technology

- Laminated DC and pulsed magnets / HV electrostatic septa (<300 kV) / Beam absorber elements
- Multi-turns, epoxy-insulated magnet coils / Single turn pulsed (UHV) coils,
- High voltage / High current feed-throughs
- Brazing/welding (ceramics, stainless, copper, glidcop, permalloy, mumetal...)
- Precision machining, vacuum brazing, UHV technology
10⁻¹² mBar



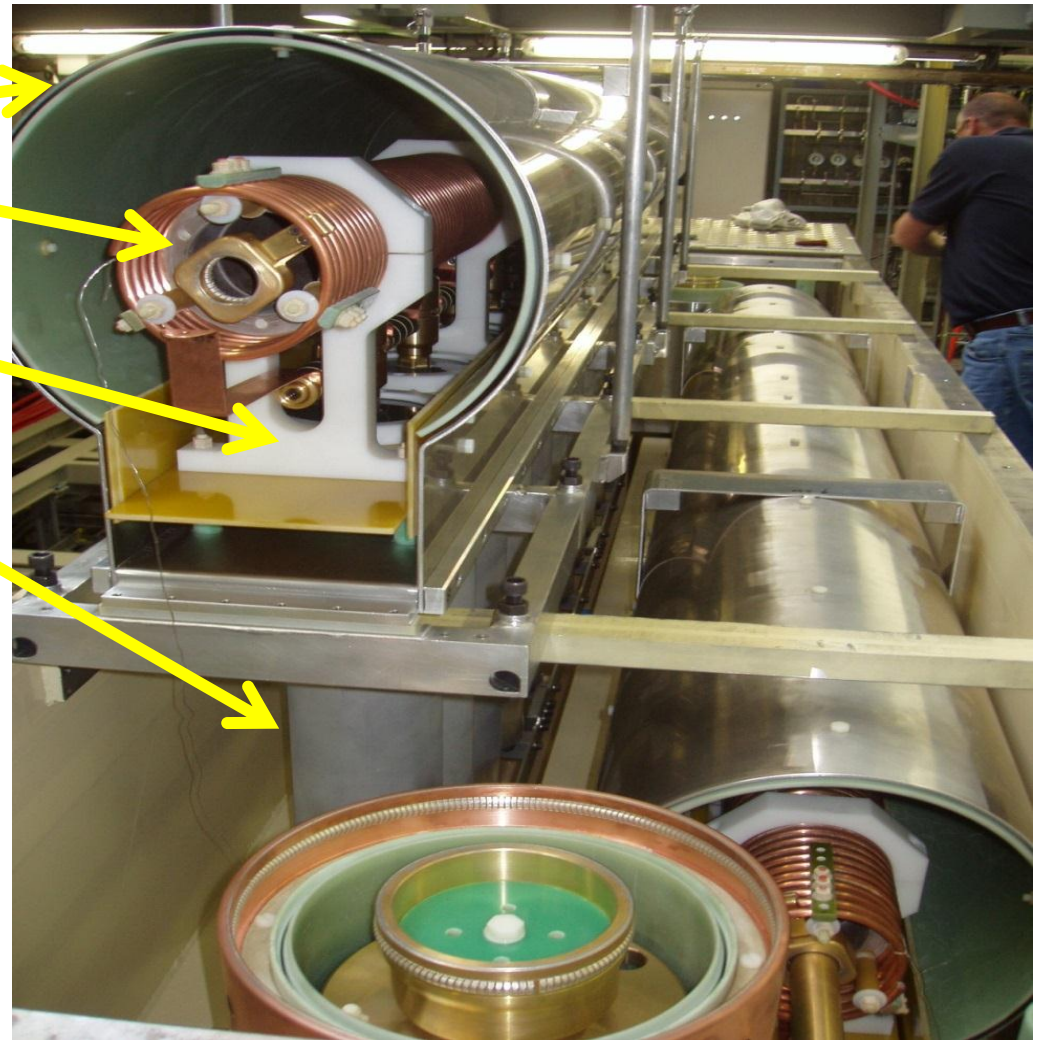
Fast Pulsed System – Magnet Technologies



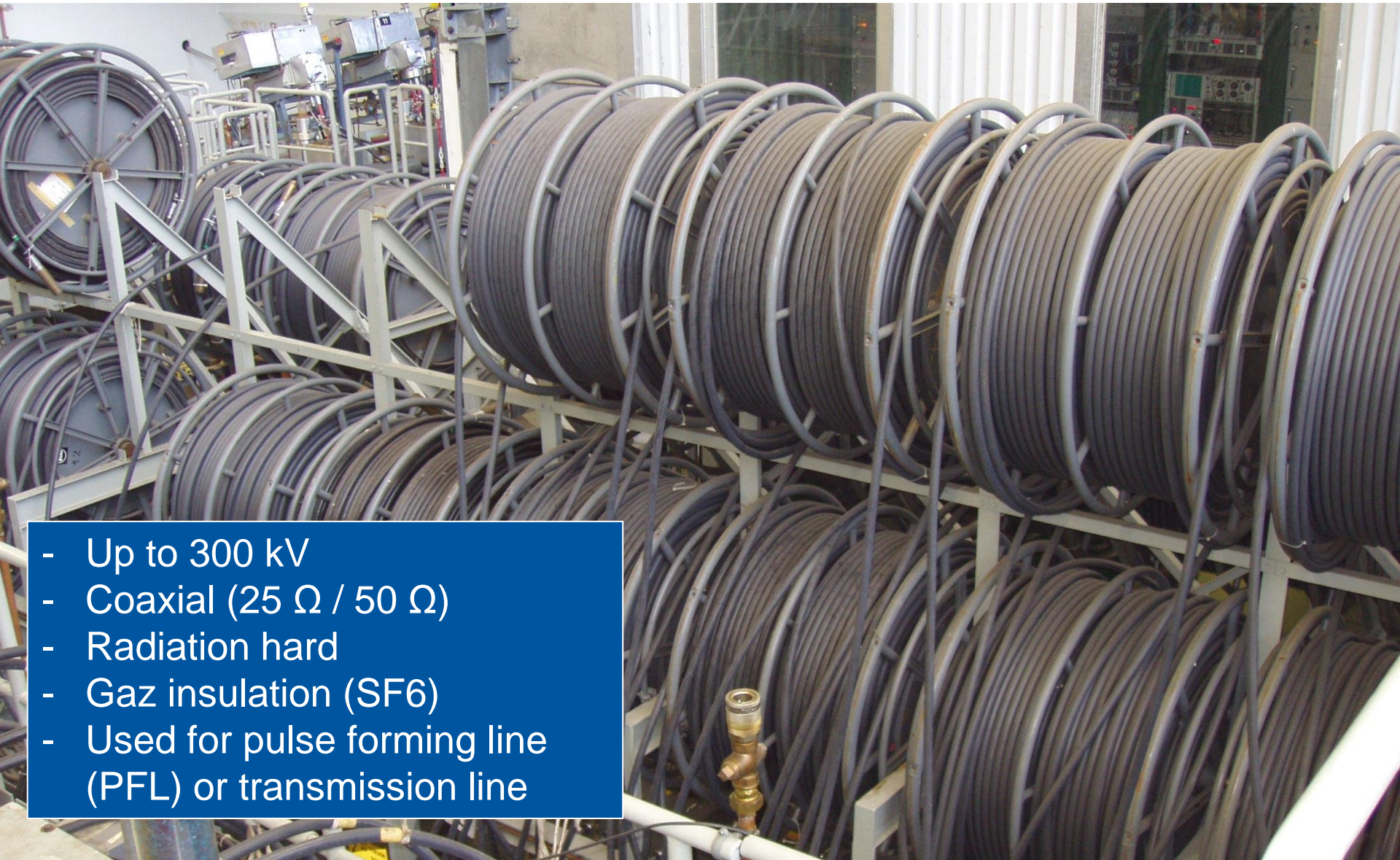
- High Voltage cables (40-80 kV)
- Ultra-High Vacuum housing
- Ceramic-metal brazed feed-through
- Surface coating

Fast Pulsed System – High Voltage Pulsed Generator

- Formed metal parts
- Machined metal parts
- Machined polymer and composite materials
- High Voltage capacitors



High Voltage Cables



- Up to 300 kV
- Coaxial (25 Ω / 50 Ω)
- Radiation hard
- Gaz insulation (SF6)
- Used for pulse forming line (PFL) or transmission line

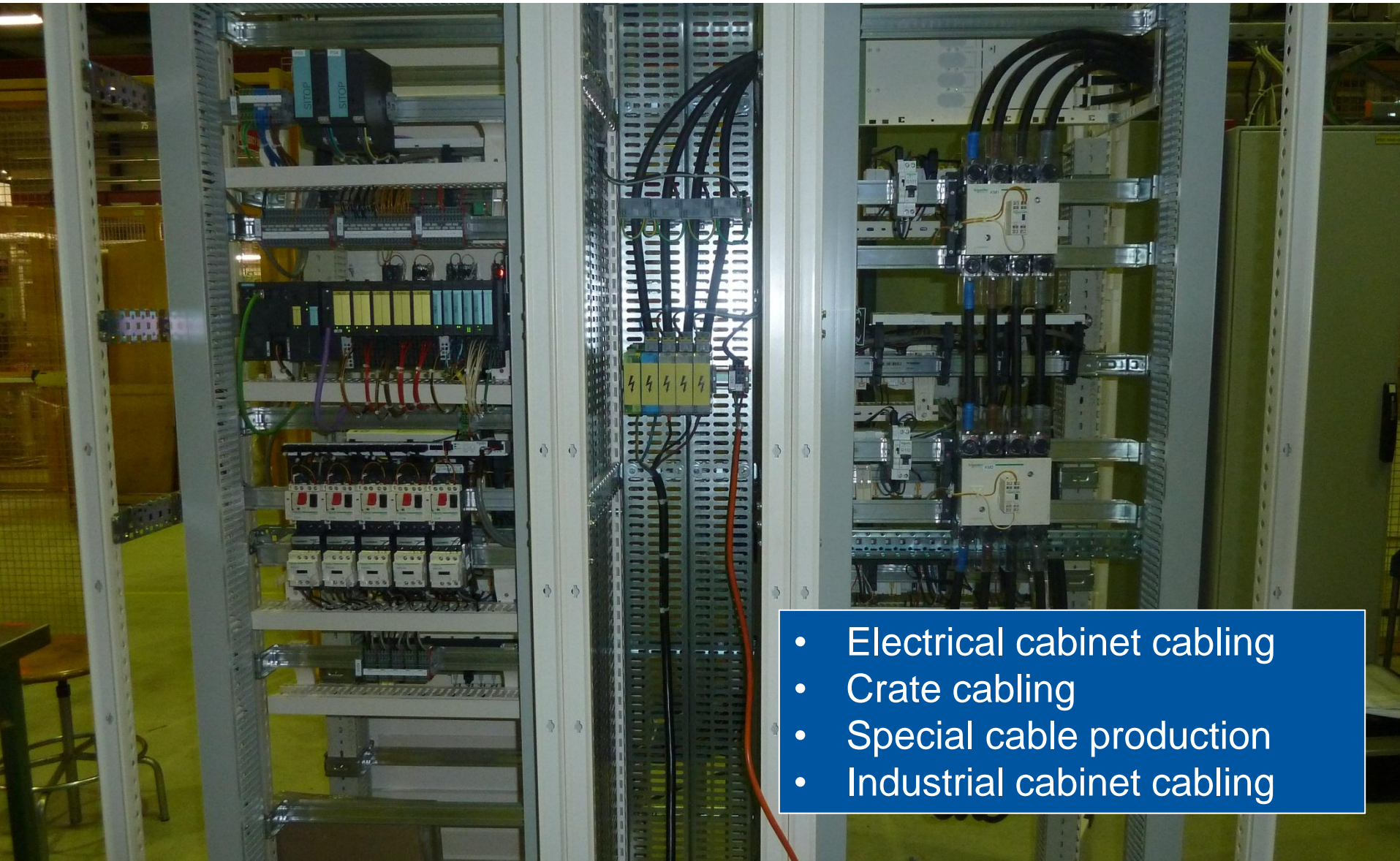
High Voltage Capacitor Chargers



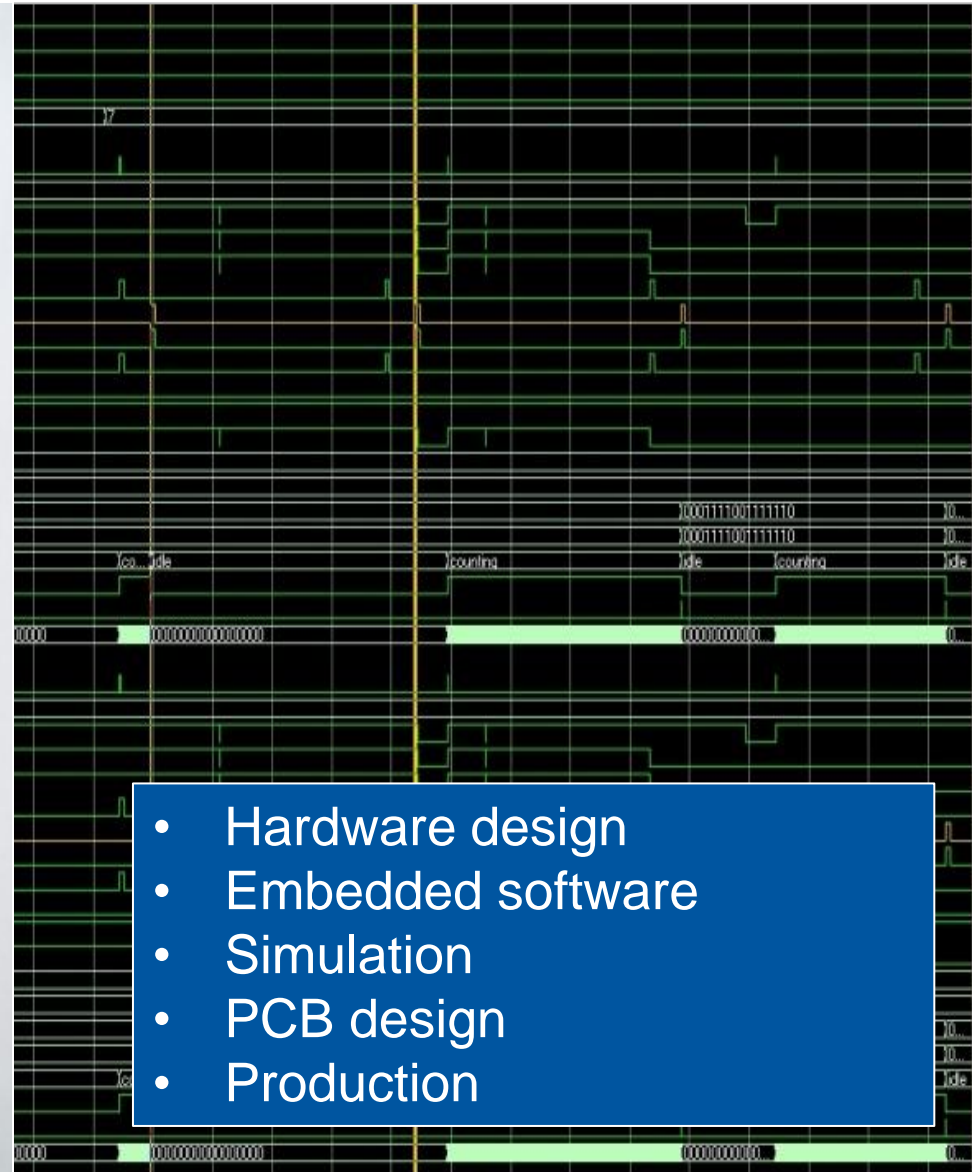
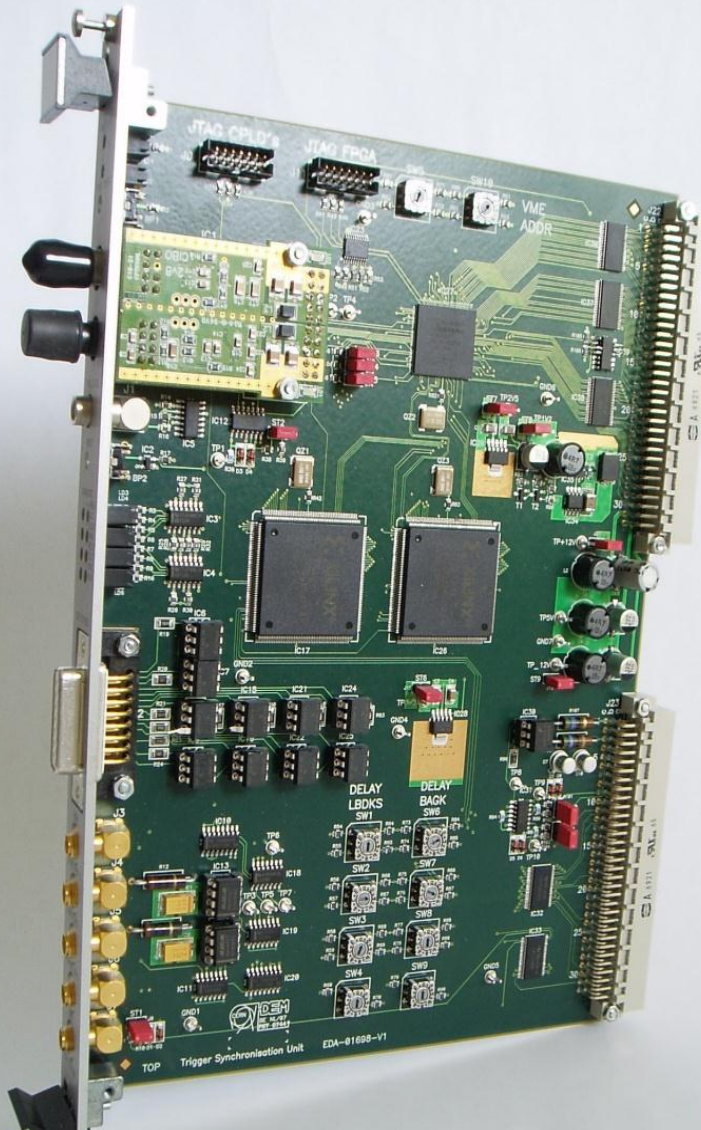
- From 300V to 60kV
- From 10mA to 15A
- High reproducibility
- High stability
- No overshoot



Hardware production

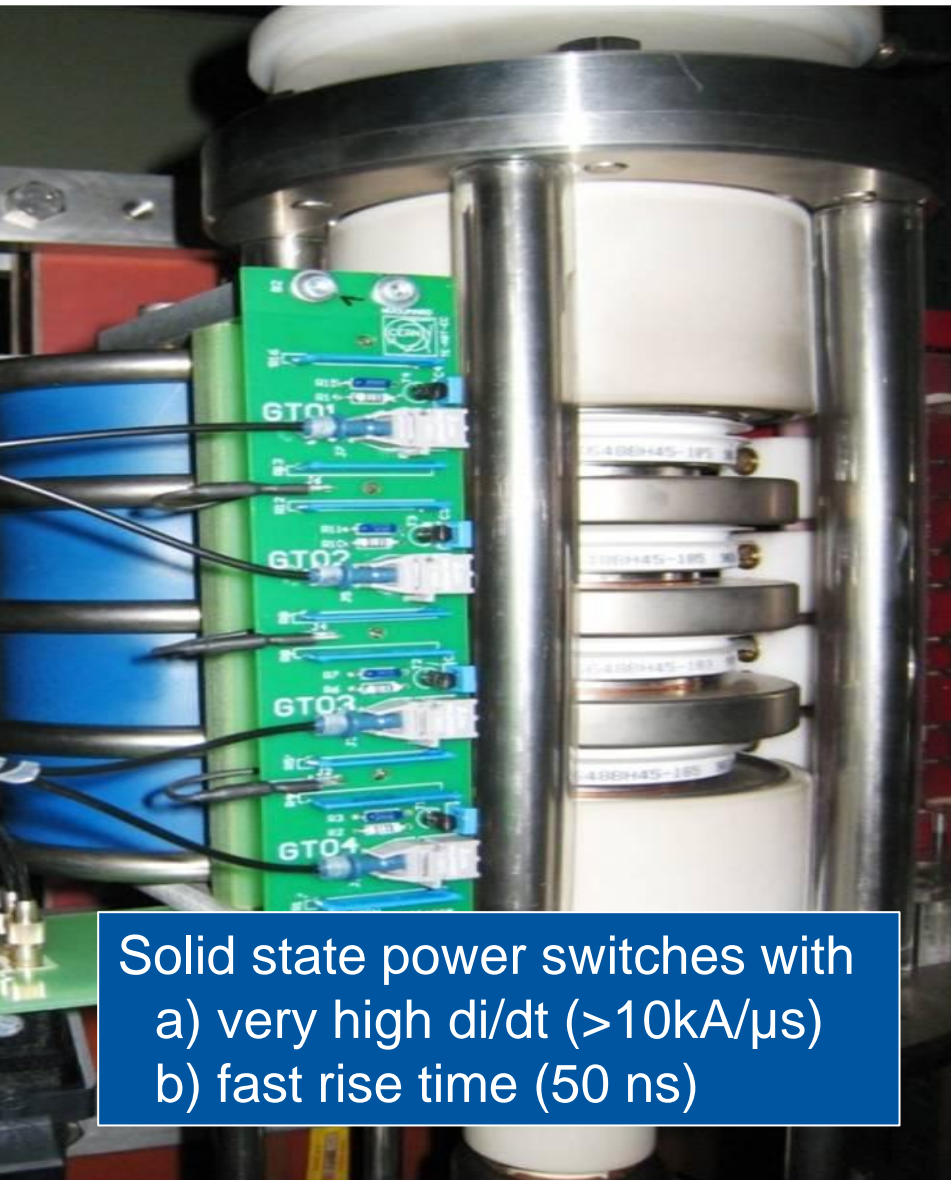


- Electrical cabinet cabling
- Crate cabling
- Special cable production
- Industrial cabinet cabling



- Hardware design
- Embedded software
- Simulation
- PCB design
- Production

Future... looking for



Solid state power switches with
a) very high di/dt ($>10\text{kA}/\mu\text{s}$)
b) fast rise time (50 ns)



Superconducting pulsed
magnet (dipole field) technology
(rise time $10\ \mu\text{s}$)



Forthcoming Price Enquiries

- 7kV / 5A capacitor chargers
- 65kV / 50mA capacitor chargers
- 80kV / 25Ω coaxial cables
- UHV stainless steel vacuum vessels
- Magnet supports, material forming and machining, for UHV
- Copper bus bar manufacture
- Electrical cabinet production
- High precision mechanical components production



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