

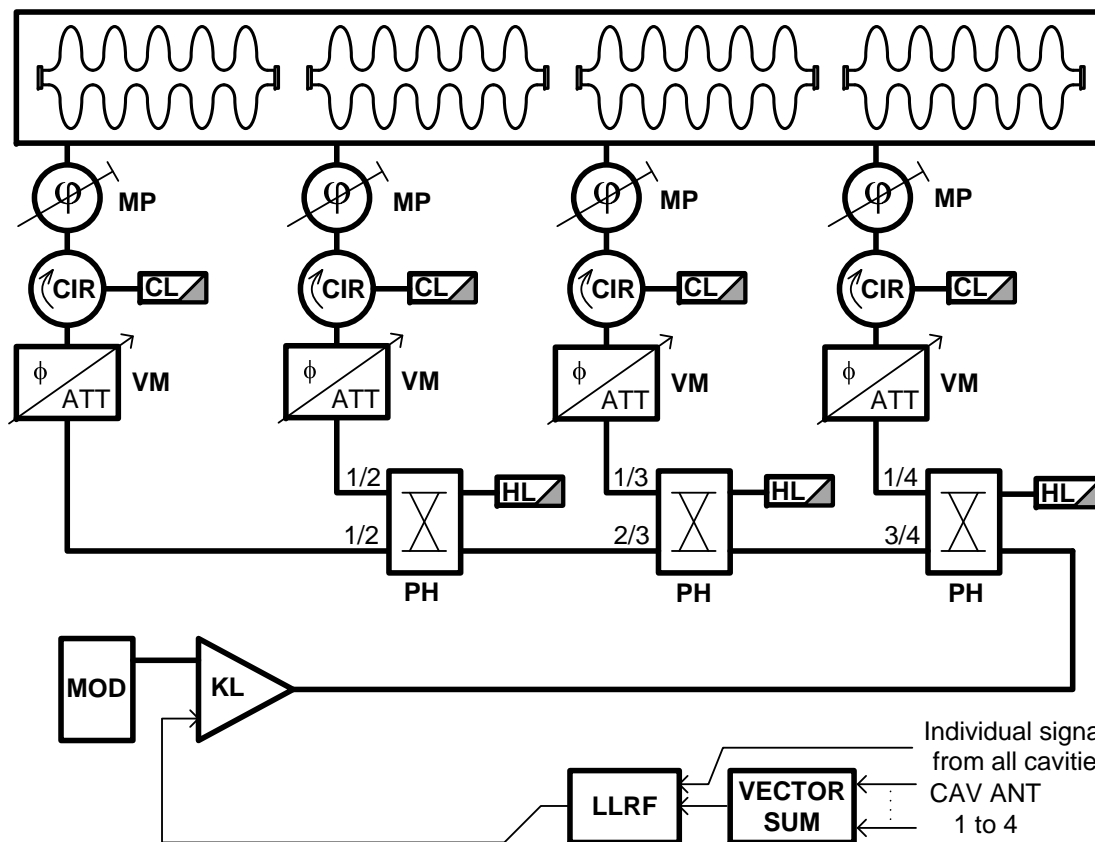


RF distribution scheme

Daniel Valuch



- If 1 klystron/4 cavities this would be a preferred layout
 - Linear distribution using less space consuming “planar” hybrids with individually adjusted coupling
 - Vector modulators for fast phase/amplitude field control
 - Mech. phase shifters for cavity phasing or isolation



KL 5MW_{PK} klystron
CIR 1MW_{PK} circulator
CL 100kW_{RMS} circ. Load
PH hybrid (e.g. planar 90°)
HL hybrid load
VM 1MW_{PK} vector modulator
MP Mech. phase-shifter/switch
MOD Klystron modulator



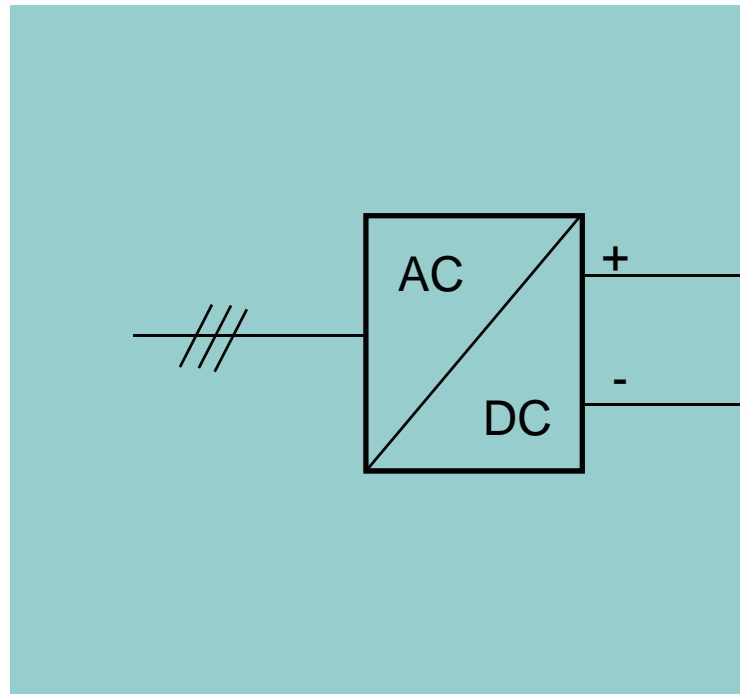
Modulator - Proposed topology for the HP-SPL

Carlos DE ALMEIDA MARTINS

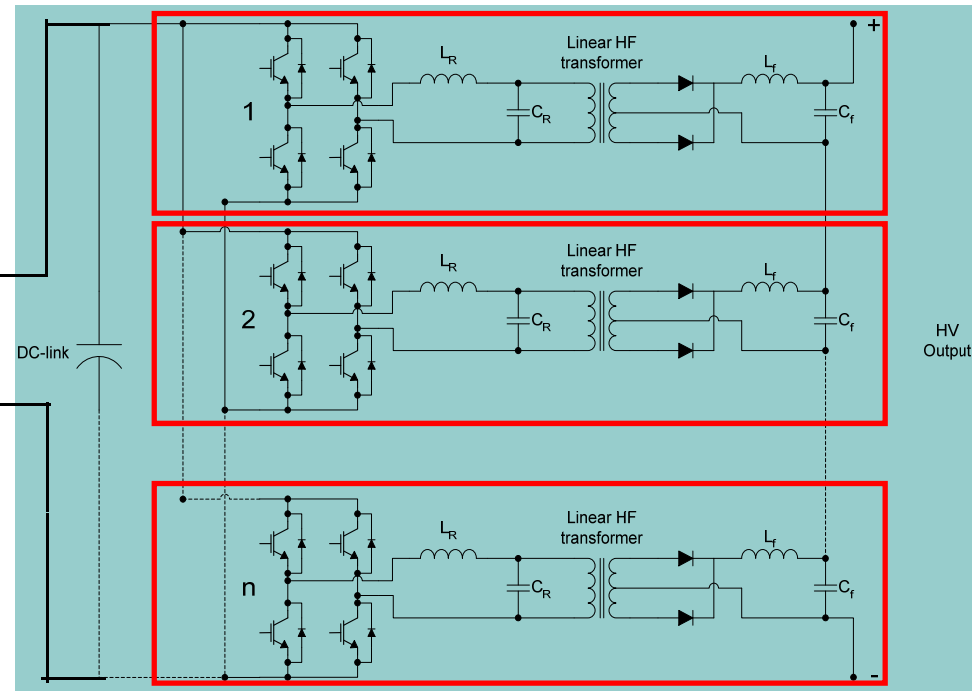


110 kV, 91A, 2.3ms, 50 Hz (10 MWpk, 1.15 MWav)

Capacitor charger: In surface building



Pulse former: In the tunnel



Pulse former:

- Modular topology (4 or 5 independent modules in parallel/series);
- Easier imposition of “soft switching” in all operating points (no coupling between modules);
- However, former hard points related to the transformers, thermal management and mechanical layout remain.



WG1 Preliminary Review of Specifications and Technical Choices



- 5 MW klystron
- No. of Cavities / Klystron 1, 4, 8 (16) ?
Unit cost of klystrons & klystron modulators favours 4/8
- Power splitting – Use **90° Hybrid** - Variable coupling by placing posts inside
(XFEL asymmetric shunt Tee does not provide sufficient isolation)
- Need to get specs & demonstrate vector modulators (CI collab)
Can we do without in LPSPL ? Specs for HPSPL
- Slow ('Manual') phase shifters – DESY design (Sliding inner plate)
- Waveguide sizing. WR1150 - HOMs
Do we need SF6? - Constraints with SF6
- **Integration & layout is a concern...**
- Tolerable power losses, realistic power overhead for feedback loops
- Study of overall HPRF system Intercavity coupling due to reflections, Beam induced signals,
(related to field stability studies)
- Modulator – HPSPL 50 Hz is a new & very different device – complete upgrade LP to HP SPL (ESS Bilbao collab)