



LHC Injectors Upgrade





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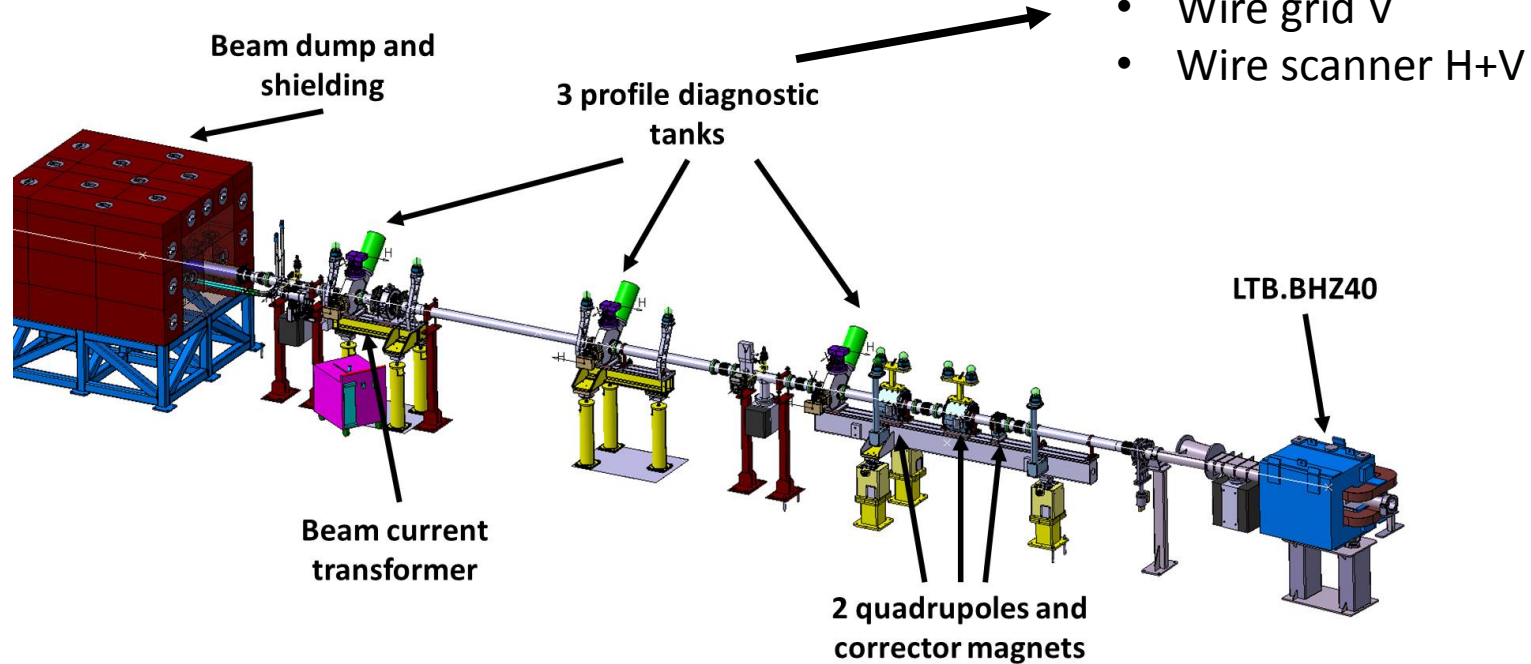
Update on L4-LBE Wire Grids, H0-H- detector, PSB BWS prototype

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LIU-PSB meeting – 22-May-2018



LBE line



3 tanks ready for installation

3 WS ready end of 2018

6 wire grids: decision on detector type to be taken (see next slides)



L4T Wire Grids

- We have a total of 6 tanks in L4T + 3 to installed in LBE hosting
 - Wire Grid H
 - Wire Grid V
 - Wire Scanner H and V
- End of 2017 we identified an issue with the wire grid signals (similar on several systems)
 - Non Gaussian profiles
 - In situ electrical inspection → short circuited channels
 - Jan 2018: removed 4 grids → 2 or more wires melted together, corresponding to electronic short circuited channels

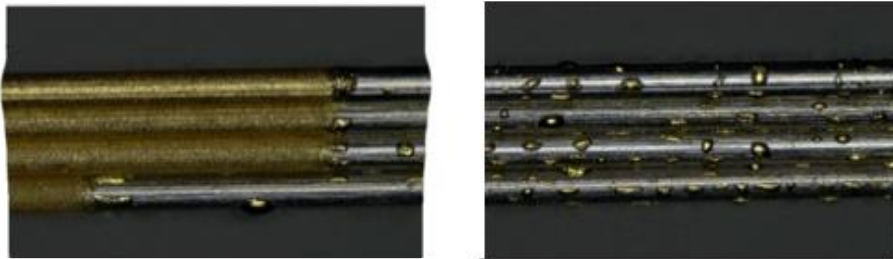




L4T Wire Grids

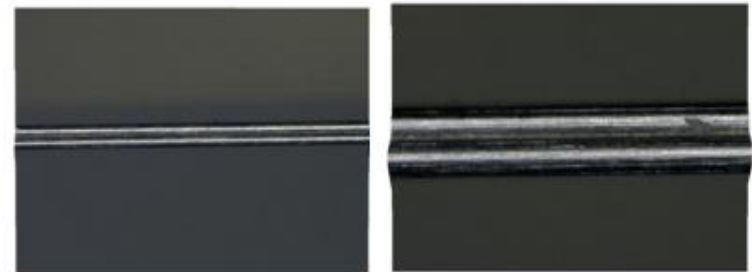


Examples of adhered W wires with Au droplets



- Tungsten wires, Gold coated
- Present understanding:
 - Heating → elongation
 - Attraction (beam induced) force
 - melted gold acting as glue

Examples of adhered W wires without Au coating



Investigating whether there was a design problem or an exceeded operational limit (we interlock on beam intensity not on beam size)

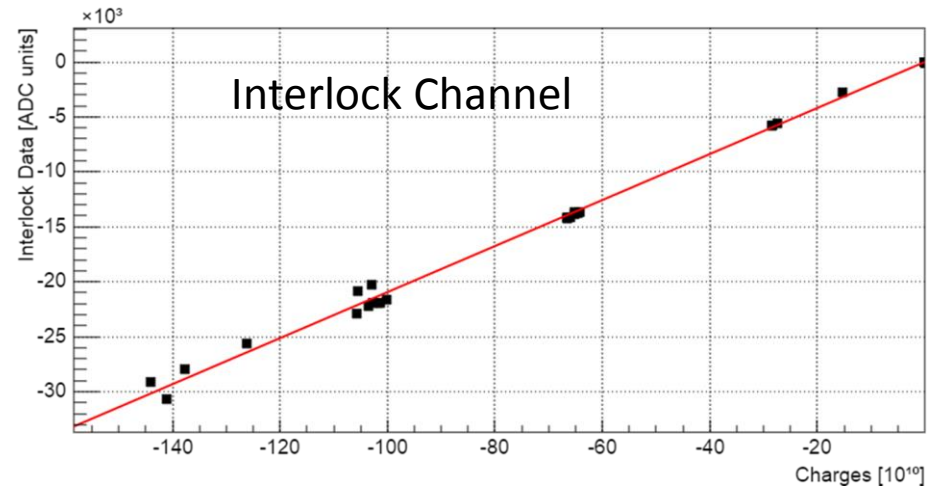
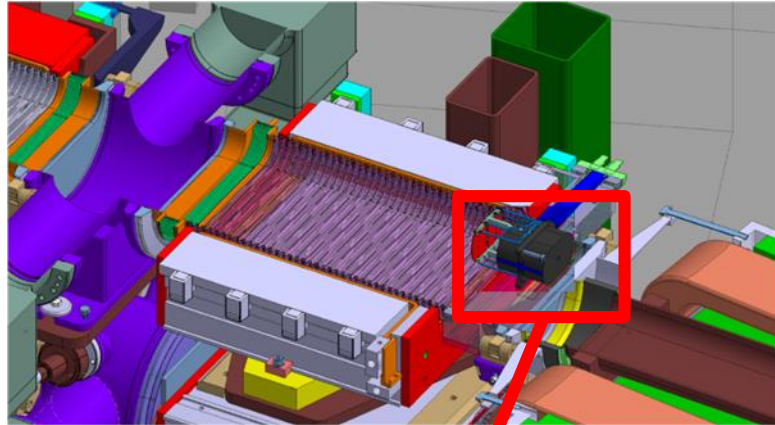


L4T Wire Grids

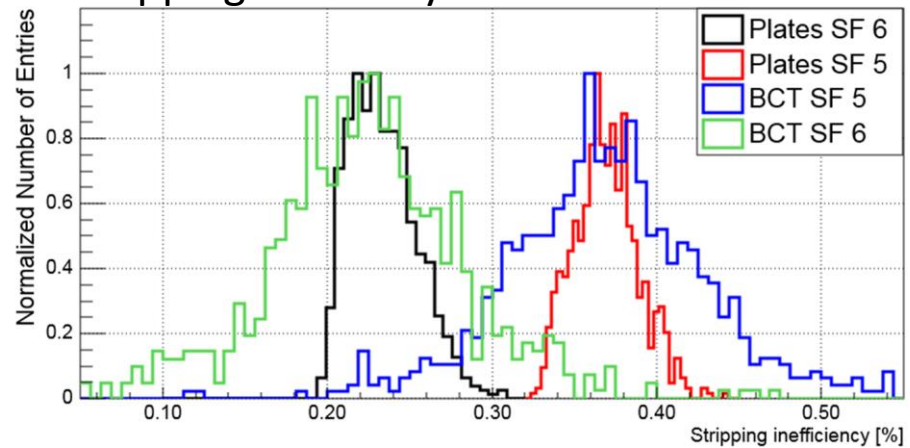
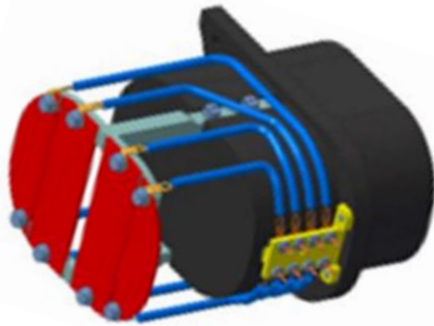
- Plan
 - Aim at installing during this L4 ETS:
 - Carbon wires grid (~easy to do)
 - Reduced heating
 - Expecting poor signal
 - New prototype with 12um strips instead of 40um tungsten wires (difficult to be in time for summer)
 - Reduced heating
 - Reduced spatial resolution (strip width + spacing)
 - Aim at defining in Autumn LBE grids design
- N.B.: at each location we have operational Wire Scanners (high precision for emittance meas., multi-shot meas.)



H0-H- Monitors @ HST



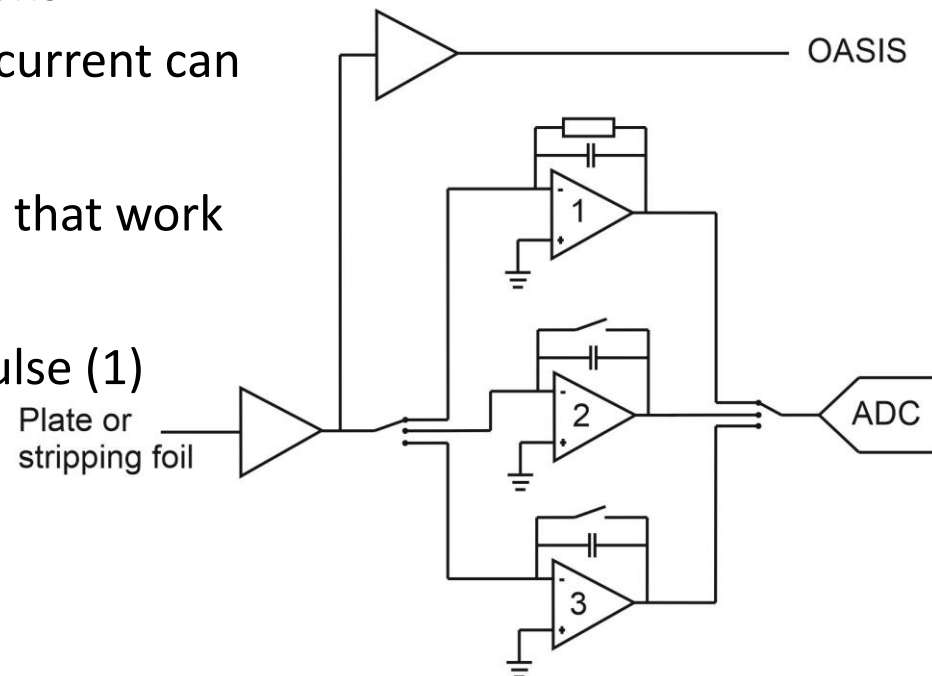
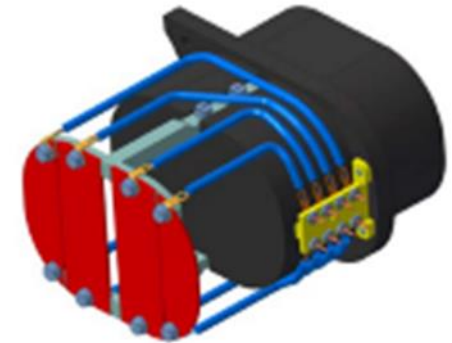
Combination of single plate channels with 2 different SF
→ stripping efficiency





H0-H- Electronics for single turn

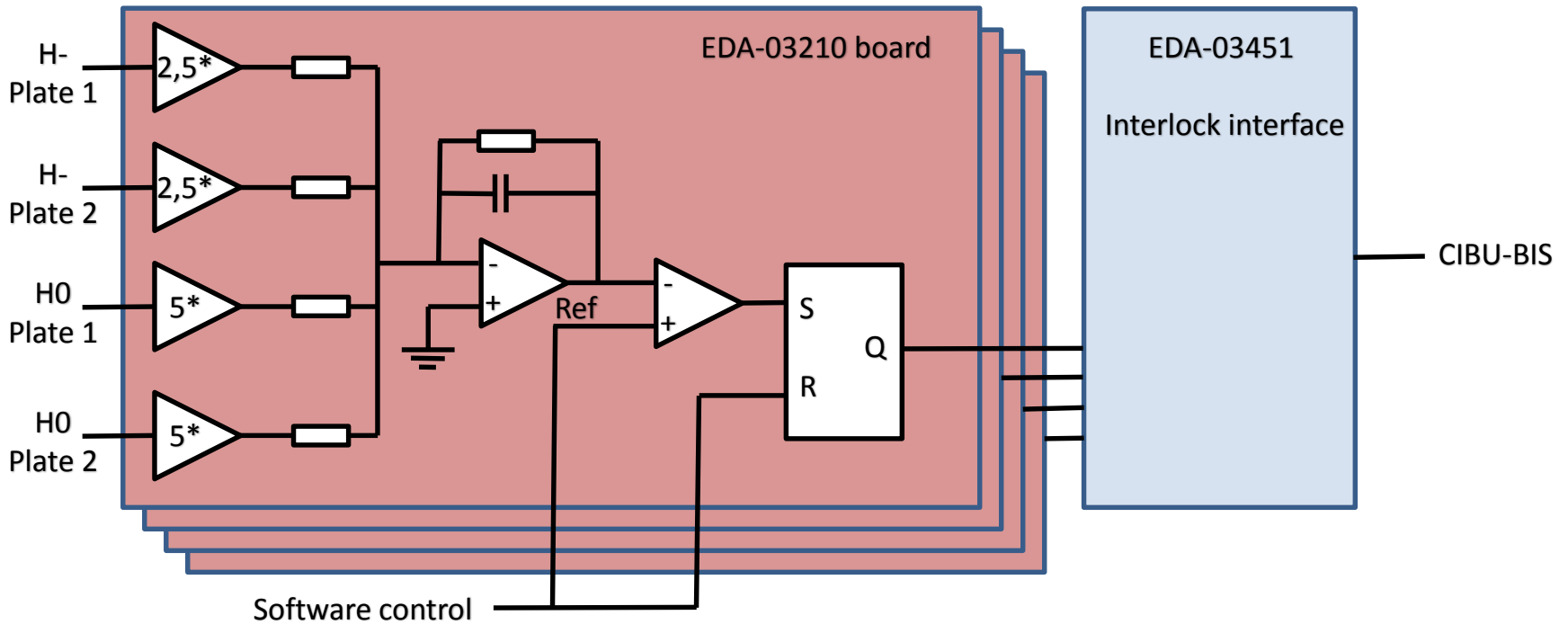
- Injection time can vary from 50ns up to 150 μ s
- Current from each plate is integrated at each $\sim 1\mu$ s Booster turn, stored in memory, then sent to FESA
- Measurement window from 150 to 950ns
- For longer injection times the average current can be calculated by software
- Each input channel has two integrators that work alternately (2 and 3)
- Dedicated integrator for single short pulse (1) with higher sensitivity





H0-H- Interlock Function

1 ring interlock amplifier
Low gain.





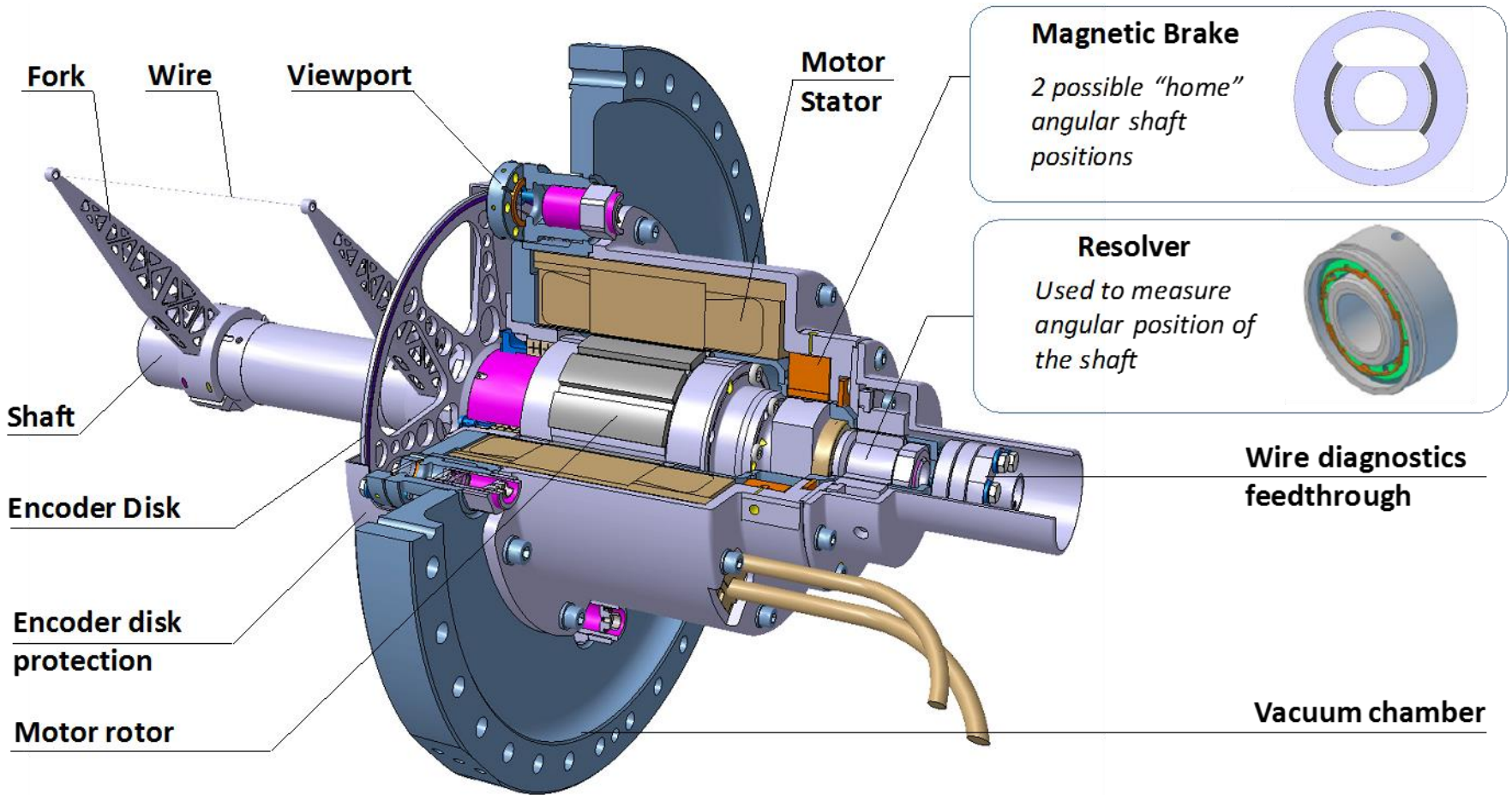
H0-H- Monitors - Electronics

- Successfully tested @ HST with prototype electronics
- Electronics design improvement (e.g. E.M.I noise)
 - Final prototype card ~fully tested
- Next:
 - Produce series (September)
 - 8 cards (4 OP + 4 spares) ~16kCHF
 - Update existing FESA
- Open points
 - Trigger logic to be based on internal clock (8ns) or external trigger from RF?
→ Board ready for both
 - E.M.I at new PSB injection region (to which extent will be verified during LS2 before the PSB RF start-up at the end of LS2?)
- N.B.:
 - System will need extensive commissioning, calibration, threshold studies (to be planned)





LIU BWS PSB Prototype





LIU BWS PSB Prototype

- Extensively tested in 2017
 - Equipped with glass encoder disk (baseline: use metallic disks)
- YETS: installed new assembly with metallic encoder disk
 - Performed several scans in the lab and in the tunnel with no beam
 - Experienced kapton wires breakage before starting beam meas
 - Reason unclear, no evidence of control issues (e.g. abrupt or multi-turn movements)
- Will inspect and repair during ITS1 either by
 - In situ intervention
 - Full scanner exchange (if new metallic disk will be available)