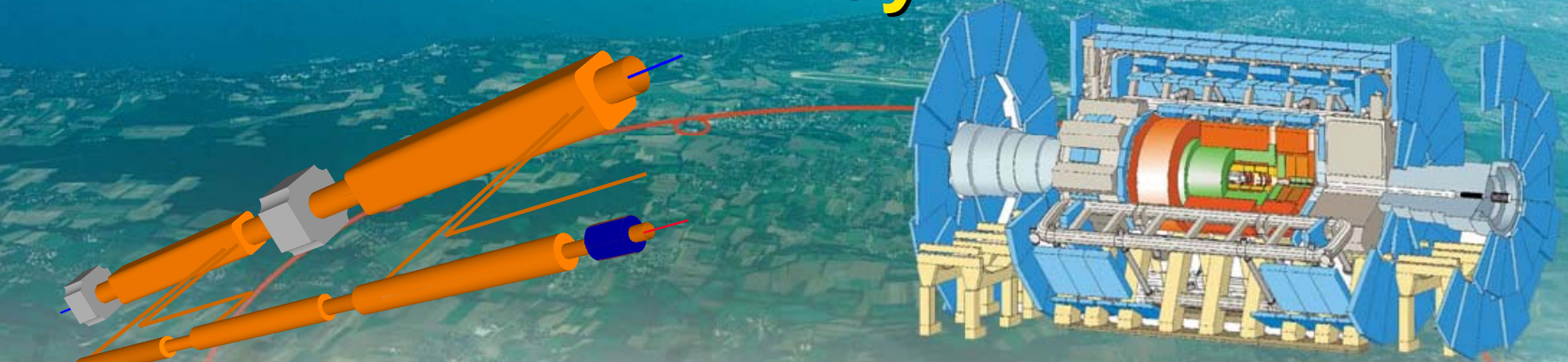




UPPSALA
UNIVERSITET



Novel Accelerator and Detector Systems



Roger Ruber

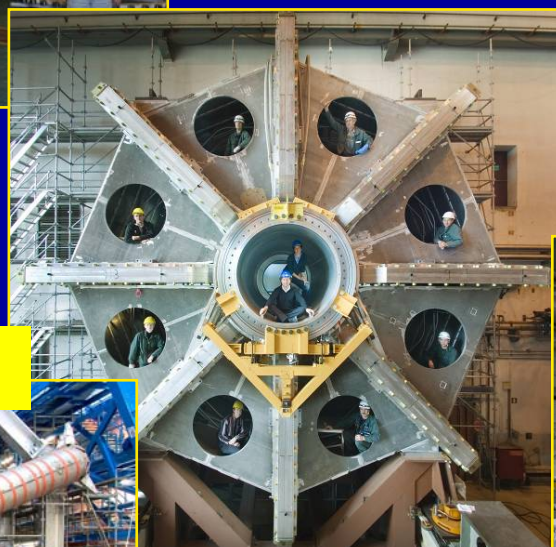
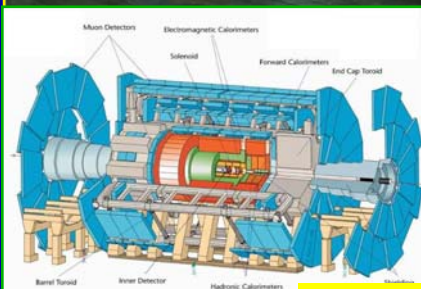
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CAI Workshop

28 September 2007



Novel Detector Systems



ATLAS



WASA

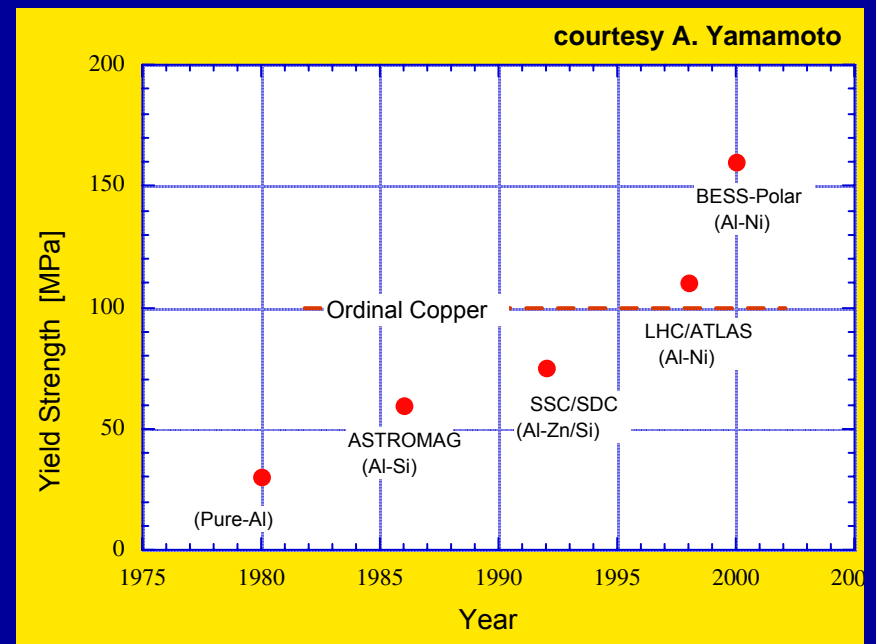
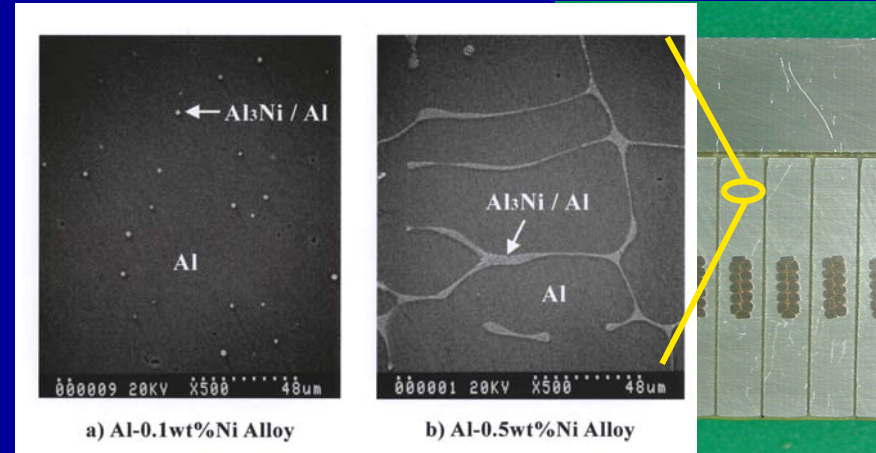


MEG

ATLAS: How to Meet the Requirements?

To provide high field while minimizing wall material

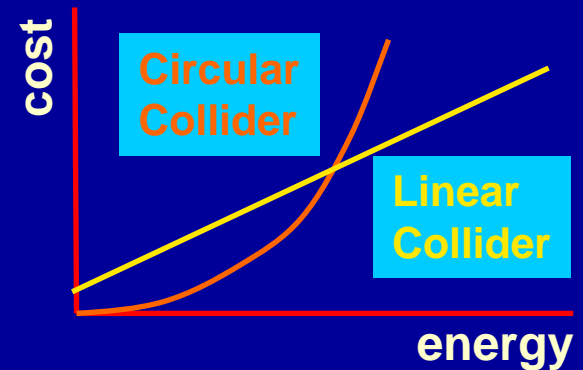
- Develop **high strength conductor**
Ni-doped Aluminium-stabilizer:
 - mechanical reinforcement while keeping quench stability
- Integrate solenoid in **common cryostat** with LAr calorimeter
- **Sophisticated design work:**
 - high strength G10 triangular support structure (sliding)
 - 3D current & cryogenics feeding
 - pure Al-strip quench propagator



Novel Accelerator Systems

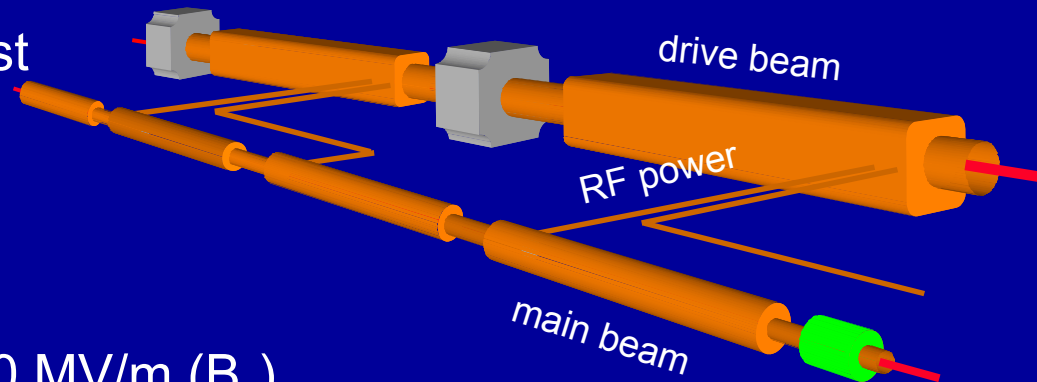
- **Circular vs. Linear Collider**

- circular accelerator → synchrotron loss
- higher acc. gradient → shorter linac



- **Power Production**

- klystron → maintenance cost
- two-beam acceleration

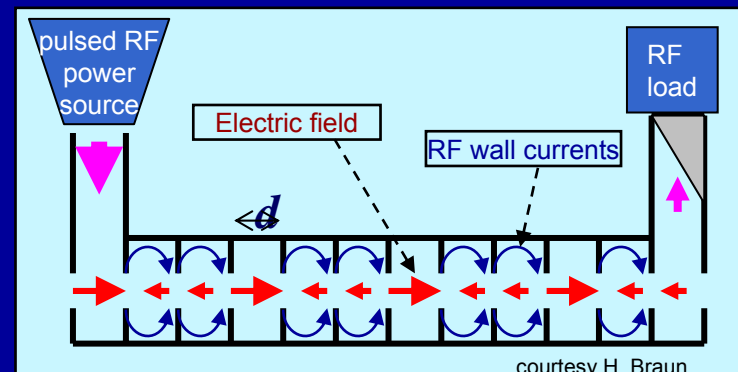


- **Accelerating Gradient**

- superconducting → limit ~ 50 MV/m (B_c)
- normal conducting → RF break down

- **CTF3 international test facility**

- power production & high gradient



- reliability issue

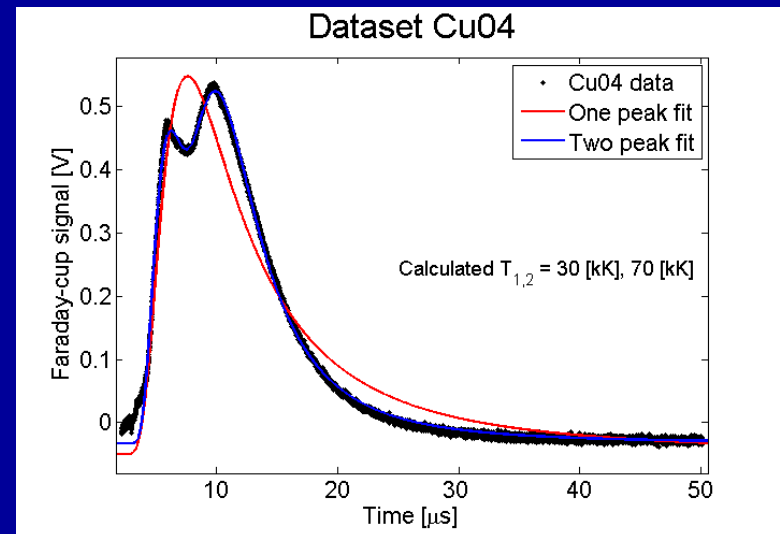
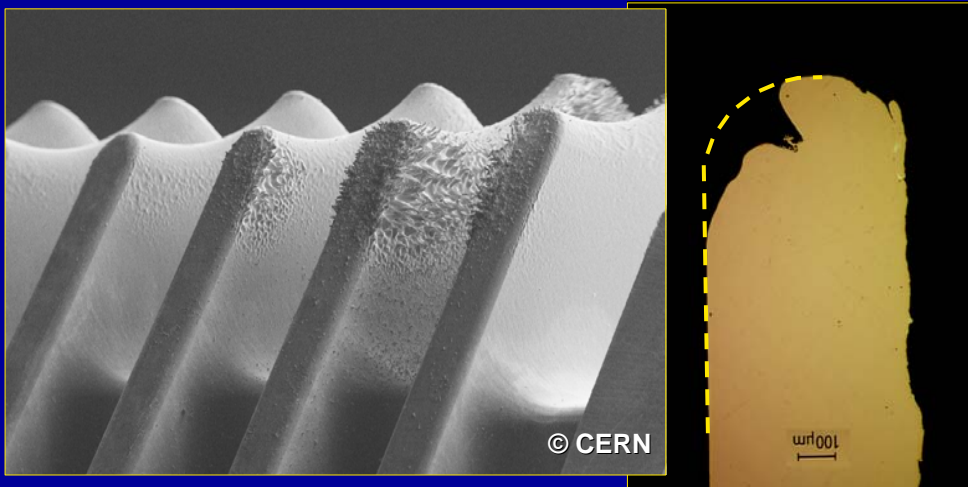
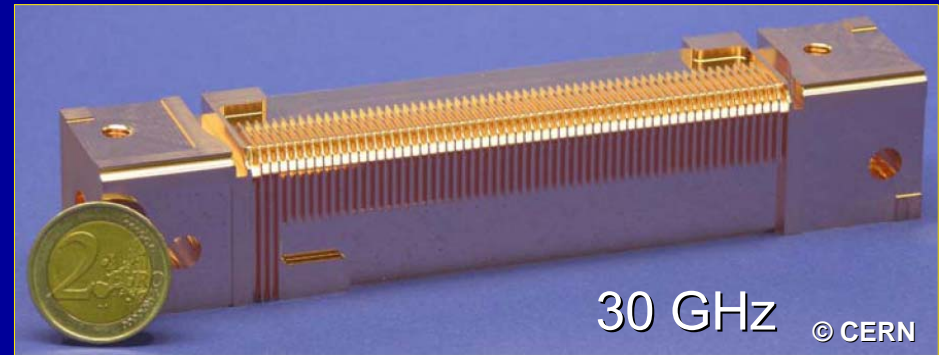
- operation stability
- beam stability (kick)

- structure damage

- conditioning to reach nominal
- damage in high field areas

- physics phenomena to be investigated

- electron & ion currents, radiation (visible, UV, X-ray)
- microscopy & DC break down



- **Broad** physics & engineering experience
- **Project management & collaboration** with CERN, KEK & industry
- **Looking for collaborators in**
 - particle & accelerator physics
 - **material science & surface physics**
 - electromagnetism
 - electronics
 - software & control
 - design, construction & engineering
 - ...



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