Physics coordinator report

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Overview of planned experiments (HIE ISOLDE apart)

- In-source laser spectroscopy on **Bi – this week (RILIS + WINDMILL + ISOLTRAP)**
- First run of year: **Cr**
- Cd, Mg upcoming (PI-ICR)

- IDS: decay of **N, In, Mn, Ba**
- He (VANDLE)
- Hg

- SSP/biophysics/:
  - **Mn** and **In** for EC/Mossbauer
  - **Cd**, & Hg for PAC
  - **Mg** for EC
  - **Rare earths for SSP**

- CRIS: **Cu**, Ra

- n-rich **Ni**, Sn, Al

COLLAPS

- **Tb isotopes and rare earths for medicine**
- Negative **At ions**
- **7Be** for nTof

Difficult “cold check-out”

Unable to heat GPS line, couple targets.

Since week 15, things have improved.

35 experiments scheduled till early August
264 shifts

Problems on GPS: unable to heat line..

Rescheduled 7Be

Switch to GPS:Mn

Negative run: rebuilt ion source (LaB6) Th/Ta foils…fast turnaround…

GPS

HRS

~~70Se~~ 64Ge

Leaking target#2

Leaking target#1

Leaking target#3…pattern emerging….neutron conv and after p+ on target

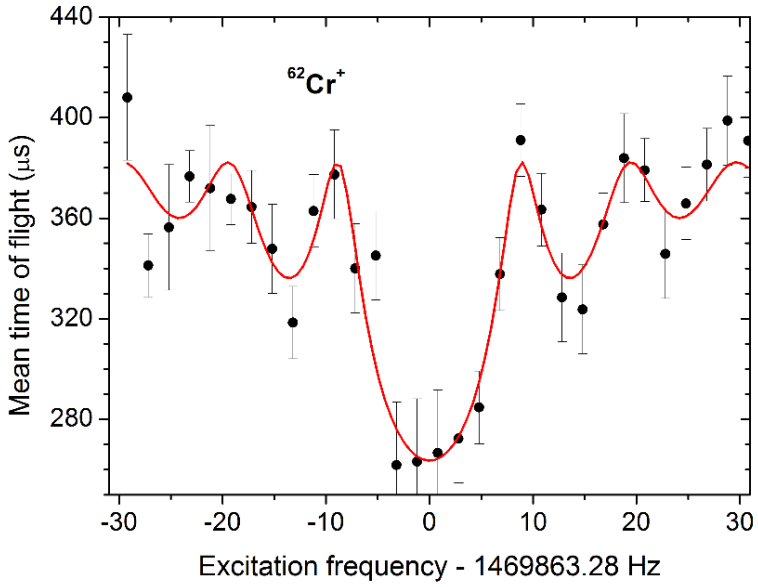
Extremely successful runs for:

- ISOLTRAP (Cr isotopes)
- CRIS (Cu)
- Medical isotopes: first **clinical** imaging with 152Tb; therapy studies with 149Tb
- Nuclear Astrophysics: 16N and 64Ge
- Solid state physics: Mg for nitride semiconductors and Mn/In for Mossbauer spectroscopy.
- 7Be collection for nTof was also possible.
- Promising Bi run underway…

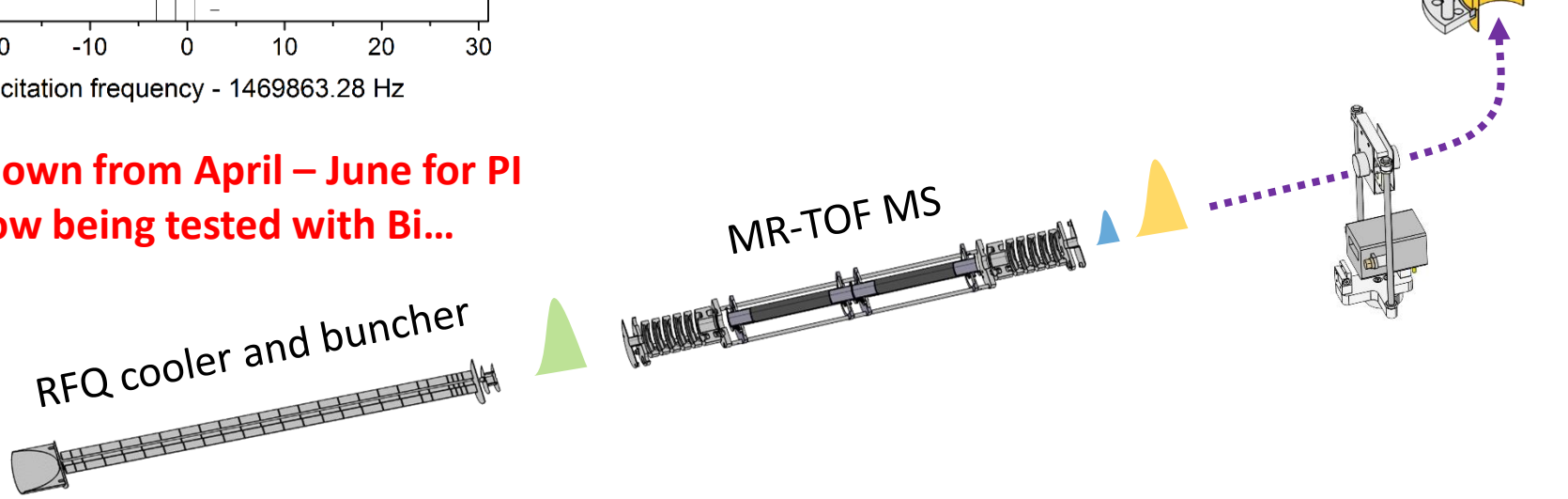
Target change GPS | Target change HRS | CERN holiday | Setting up HRS | Setting up GPS

KJ 26.06.16

- Intense n-rich chromium beams up to mass 63 were studied for the first time at ISOLDE with the Penning-trap mass spectrometer ISOLTRAP.

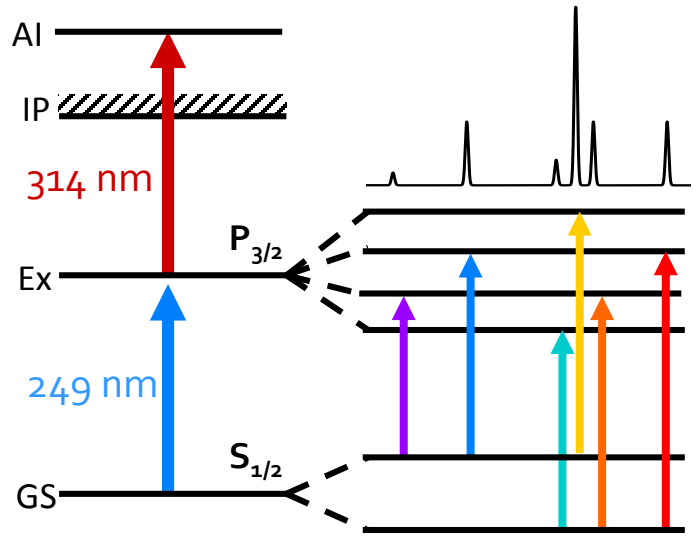


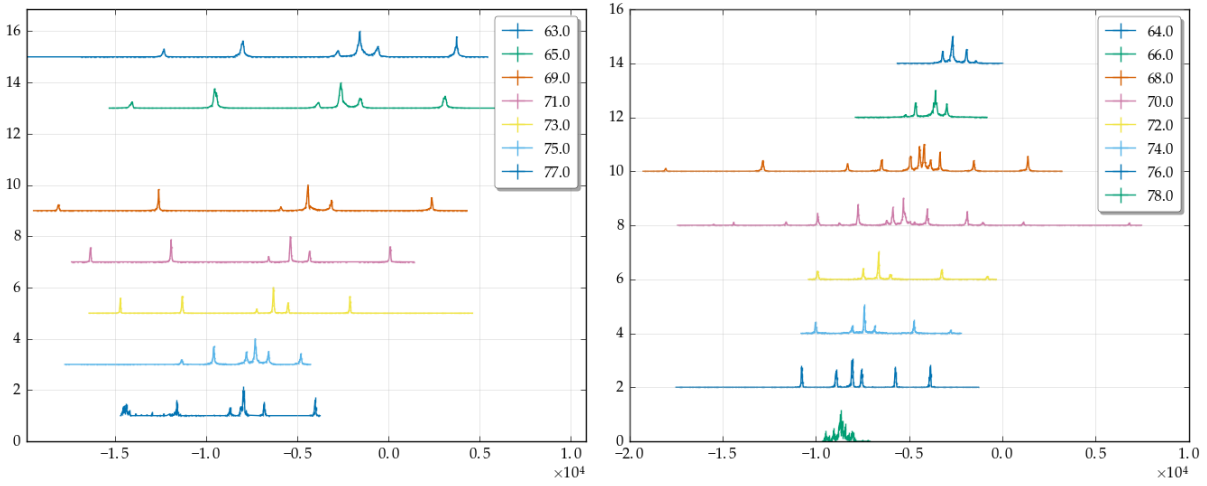
Mini shutdown from April – June for PI ICR…now being tested with Bi…



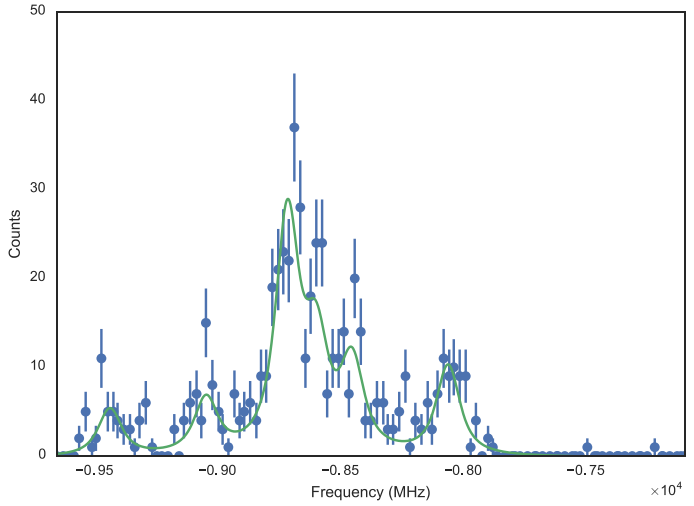
The CRIS experiment: 2016 so far

- High resolution collinear resonance ionization spectroscopy of neutron-rich copper isotopes
  - Study evolution of the shell model with neutron excess
- **Aim**: Study spins, magnetic and quadrupole moment of 76-78Cu
- **Outcome**: Studied HFS of **15** isotopes 63-66,68-78Cu
- First RIS scheme to an auto-ionizing state for CRIS
  - 249.2 nm tripled light from injection-seeded TiSa cavity locked to M2 Ti:Sa laser and 314.2 nm doubled light from PDL laser pumped by Litron laser





^{78}Cu: < 20 ions/s



IS568: Laser spectroscopy of Ni at COLLAPS

Aim: Study sub-shell effects at N=40…

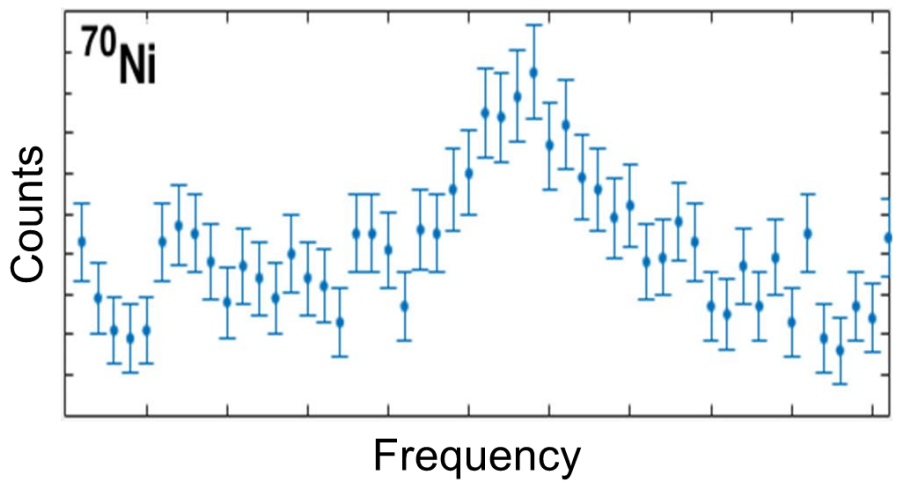
➔ Is there an upward kink in the charge radius? Effect on the moments?

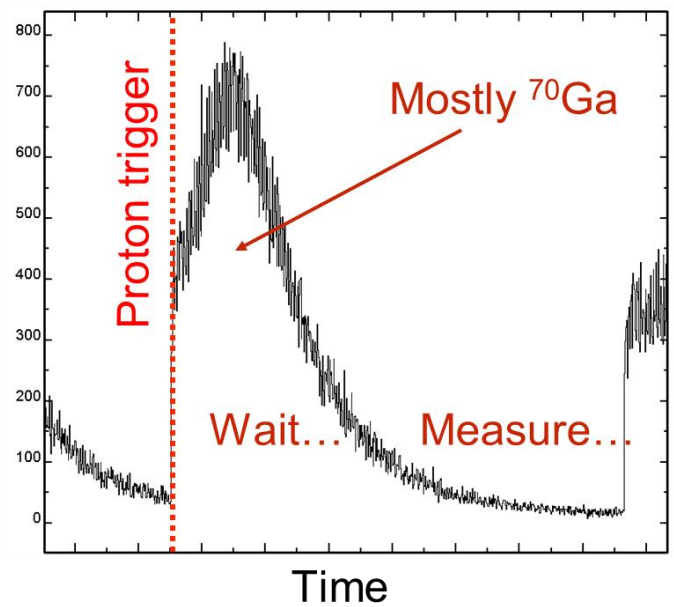
Low target yields from experimental unit ➔ decided against converter

✗ Could not measure ^{69,71}Ni — crucial for studying moments past N=40

✓ Could measure ^{70}Ni — (since only a single peak) will give charge radius

Had to gate out ^{70}Ga contamination





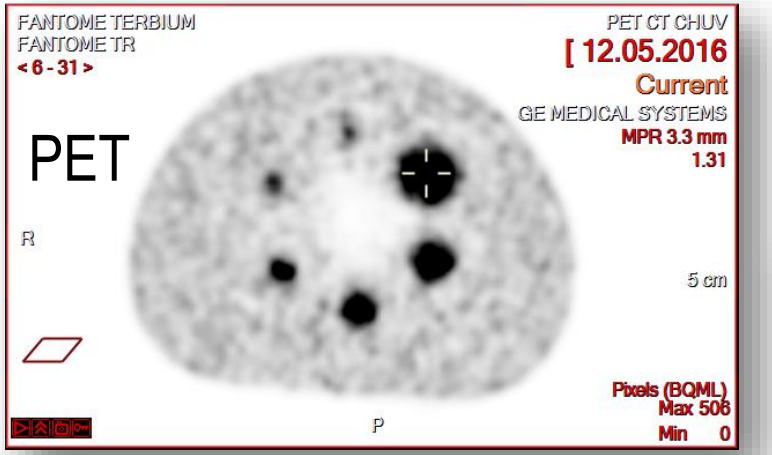
Mössbauer collaboration at ISOLDE/CERN

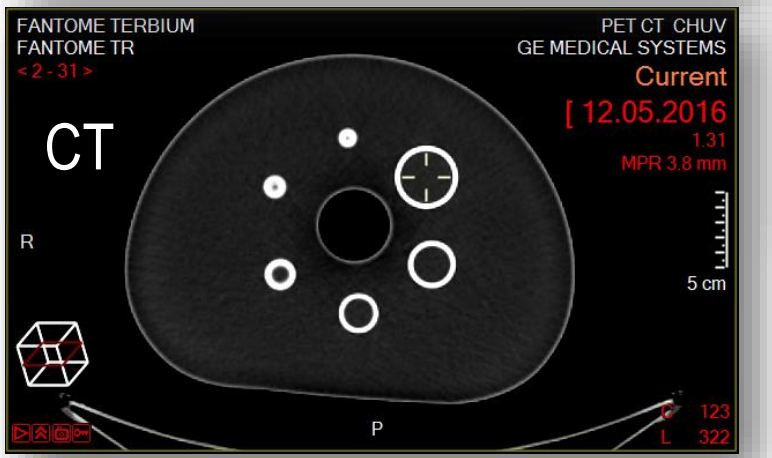
- Six experiments:
  - IS501: Oxides and silicon
  - IS576: (Al, Ga)N:Mn
  - IS578: Mn based alloys
  - IS611: MoO_x and 2D materials
  - IS612: Topological insulators
  - I161: New isotopes

- Beam time 2016:
  - Extremely successful ^{57}Mn & ^{119}In on-line runs, **> 65 individual** experiments
  - Some highlights:
    - Sn site symmetry in topological semiconductors
    - Nature of Fe sites in silicon at low T's
    - Charge state of Fe in Mn doped nitrides
    - Implantation physics in manganese alloys
    - Crystallization in MoOx
    - …

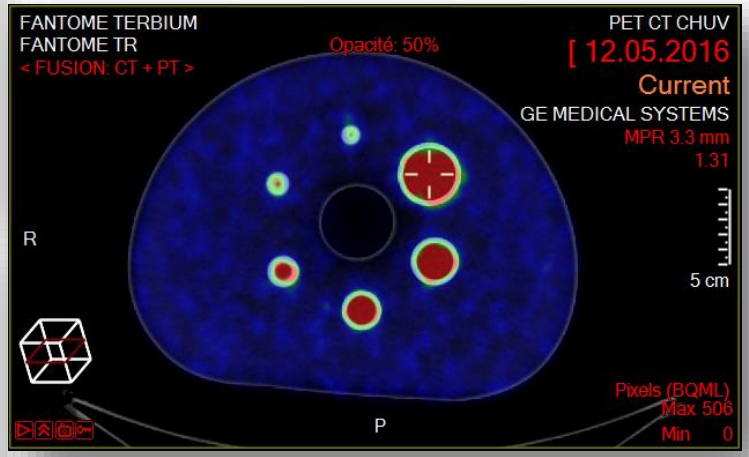
First Clinical Phantom Study

^{152}Tb-Phantom Study performed at CHUV, Lausanne – Images kindly provided by Prof. Dr. John Prior

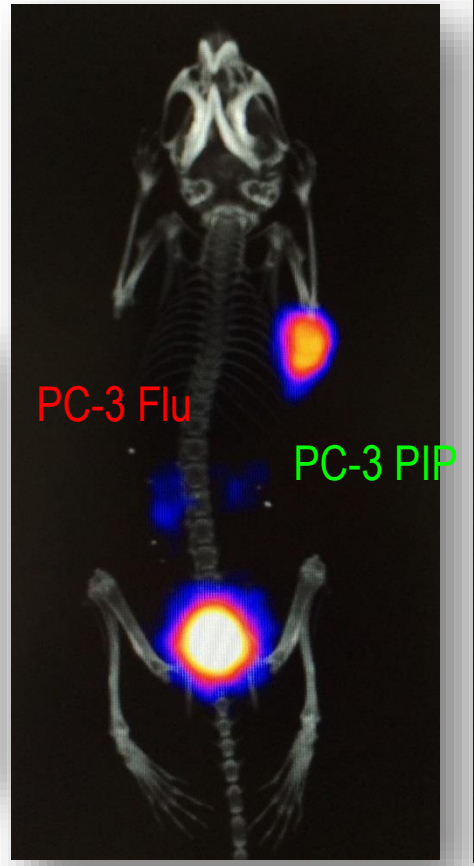


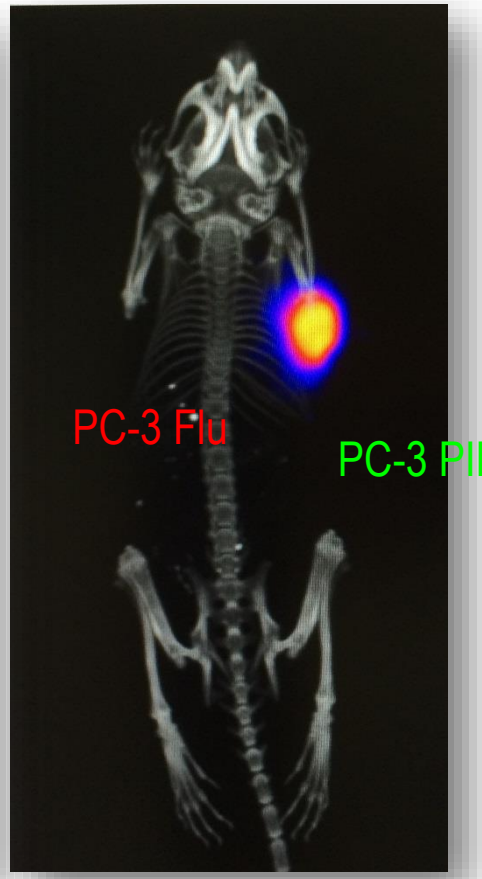


PET/CT



^{152}Tb-PSMA617 – First images obtained at PSI





15 min p.i.

24 h p.i.

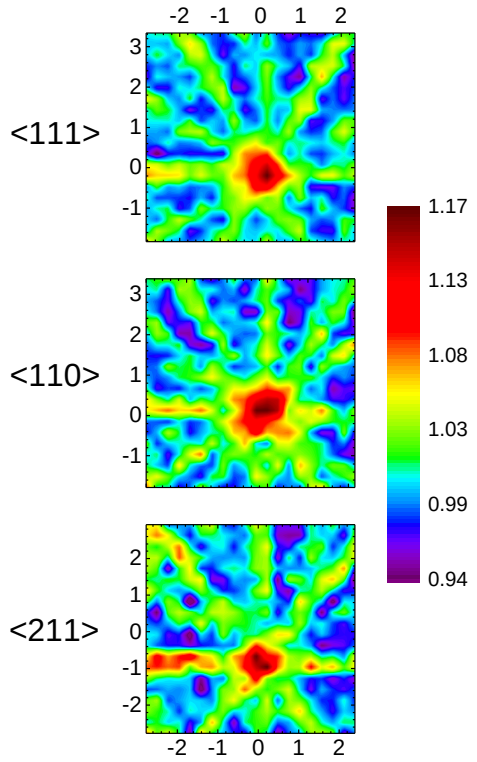
50-60 MBq of a ^{152}Tb-Ligand should be sufficient for a Patient Scan

PC-3 PIP: PSMA-positive
PC-3 Flu: PSMA-negative

EC-SLI (IS580)

Emission Channeling with Short-Lived Isotopes (online)

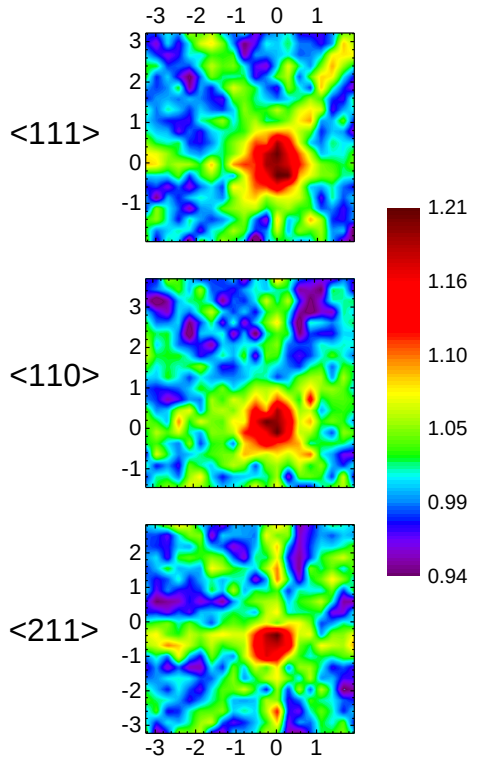
Successful emission channeling measurements on topological insulators



example spectra:
Mn-doped PbTe, implanted at 100 °C

^{56}Mn (2.6 h)

- Mn as magnetic dopant
- magnetic properties depend on Mn lattice site (e.g. substitutional *versus* intersitital)
- EC is used to determine the lattice location



example spectra:
Sn-doped PbTe, implanted at 200 °C

^{123}Sn (40 min)

- parent: ^{123}In
- *isotope used for first time for EC*
- doping with Sn induces a rhombohedral distortion; the topological state (e.g. topological insulator, Rashba semiconductor, or trivial) depends on the magnitude of this distortion
- EC is used to characterize the distortion

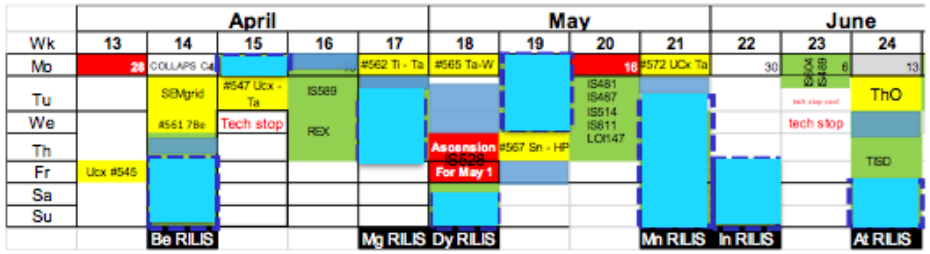
KU LEUVEN

Increased intensity of RILIS operation

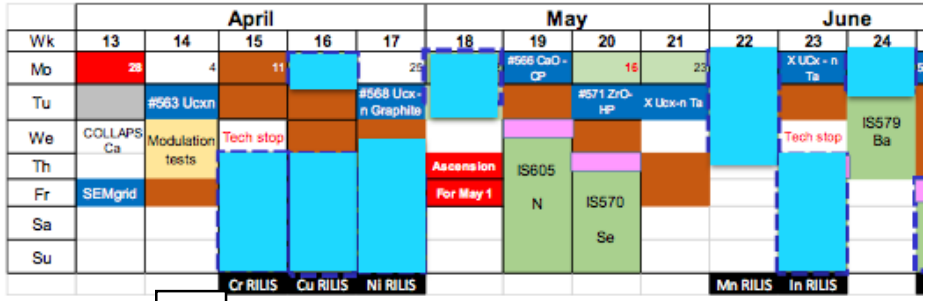
- thanks to new RILIS operating guidelines

(Weeks 13-32)

GPS



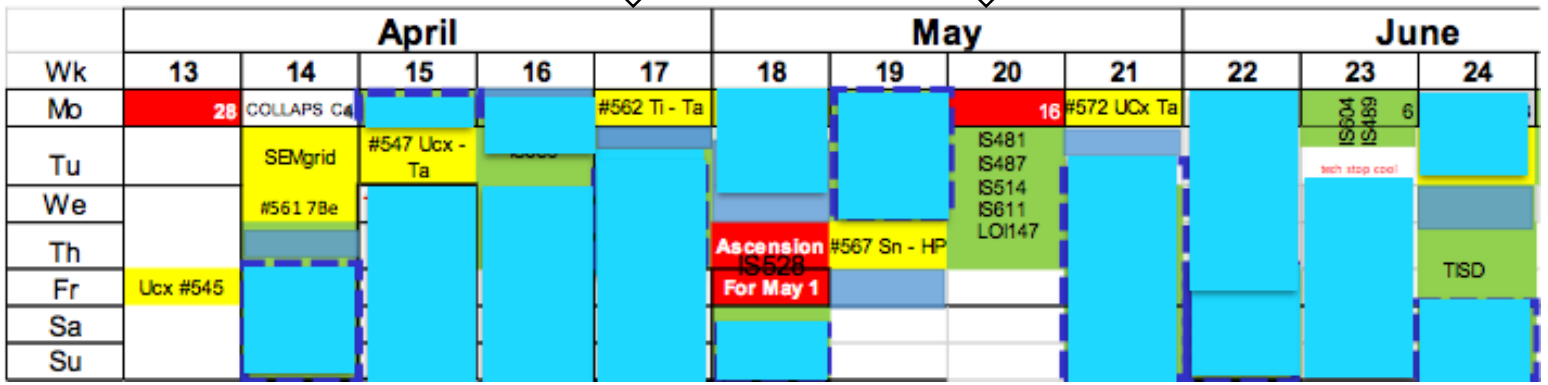
HRS



On-call operation
for ALL standard RILIS runs

GP S + H RS

100 % success rate
so far in 2016



Advantages:

No restriction on total number of operating hours

No restriction on number of consecutive weekends of operation

Improved ease of scheduling and # of RILIS runs for USERS

Conclusions from workshop and Reality...

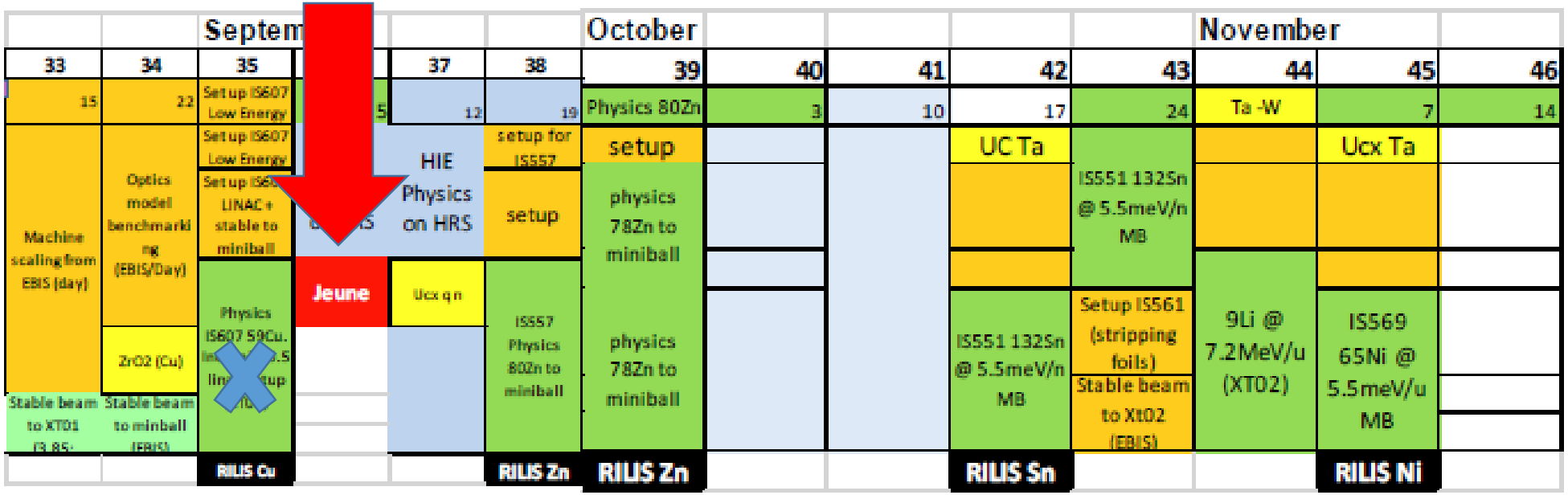
- 24 approved proposals ask for beam time in 2016 → won't be able to serve more than 7
- Full energy range of accelerator up to 6.0 MeV/u → 5.5MeV/u
- Mass range from ^{9}Li up to ^{228}Ra → intermediate masses
- MINIBALL configuration for Coulomb excitation and transfer reactions will be installed for 2016 campaign → going to go with C-REX
- Combination with SPEDE is available after successful stable beam commissioning in summer 2016 → tests continuing
- High number of experiments should be provided to user community → do our best
- Everyone is eagerly awaiting the HIE-ISOLDE beams → no argument there...

Beams 2016: chosen for intensity, and ramping up of A/q etc

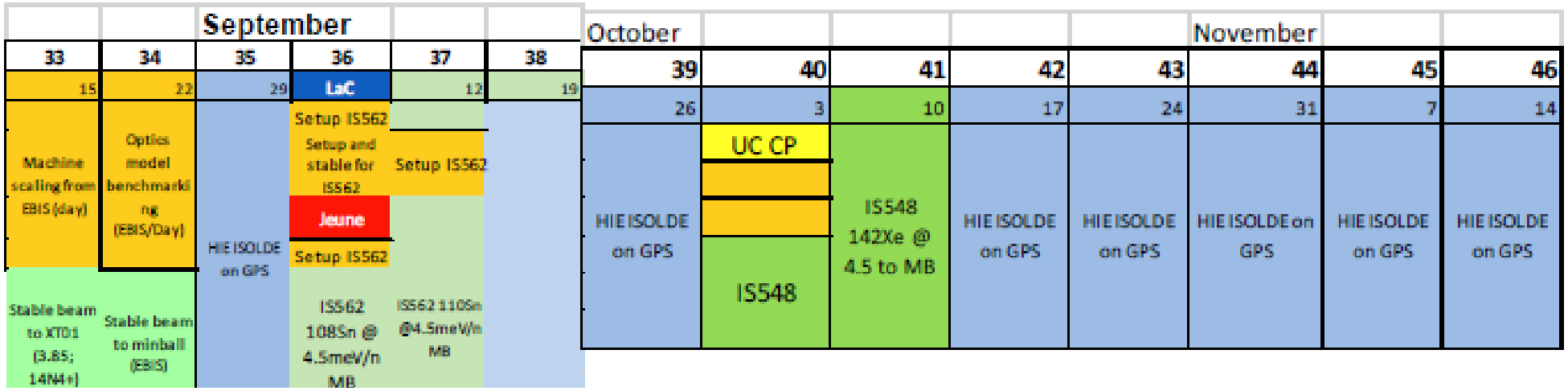
108Sn, 80Zn, 142Xe, 132Sn, 9Li, 59Cu(?), 66Ni? 70Se?

New possible start… : HIE ISOLDE SCHEDULE 2016

GPS

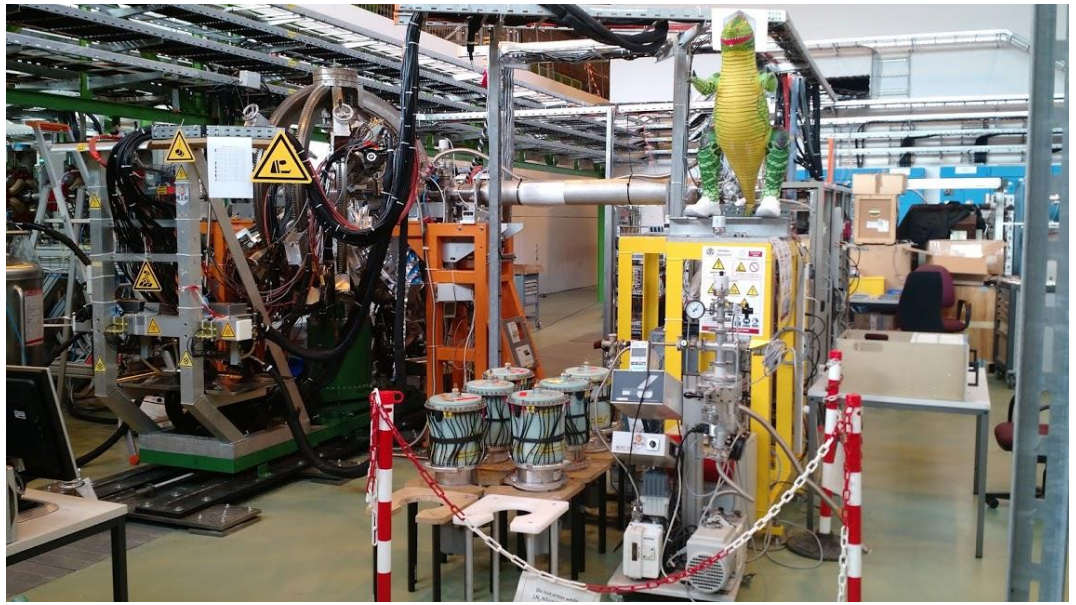


HRS



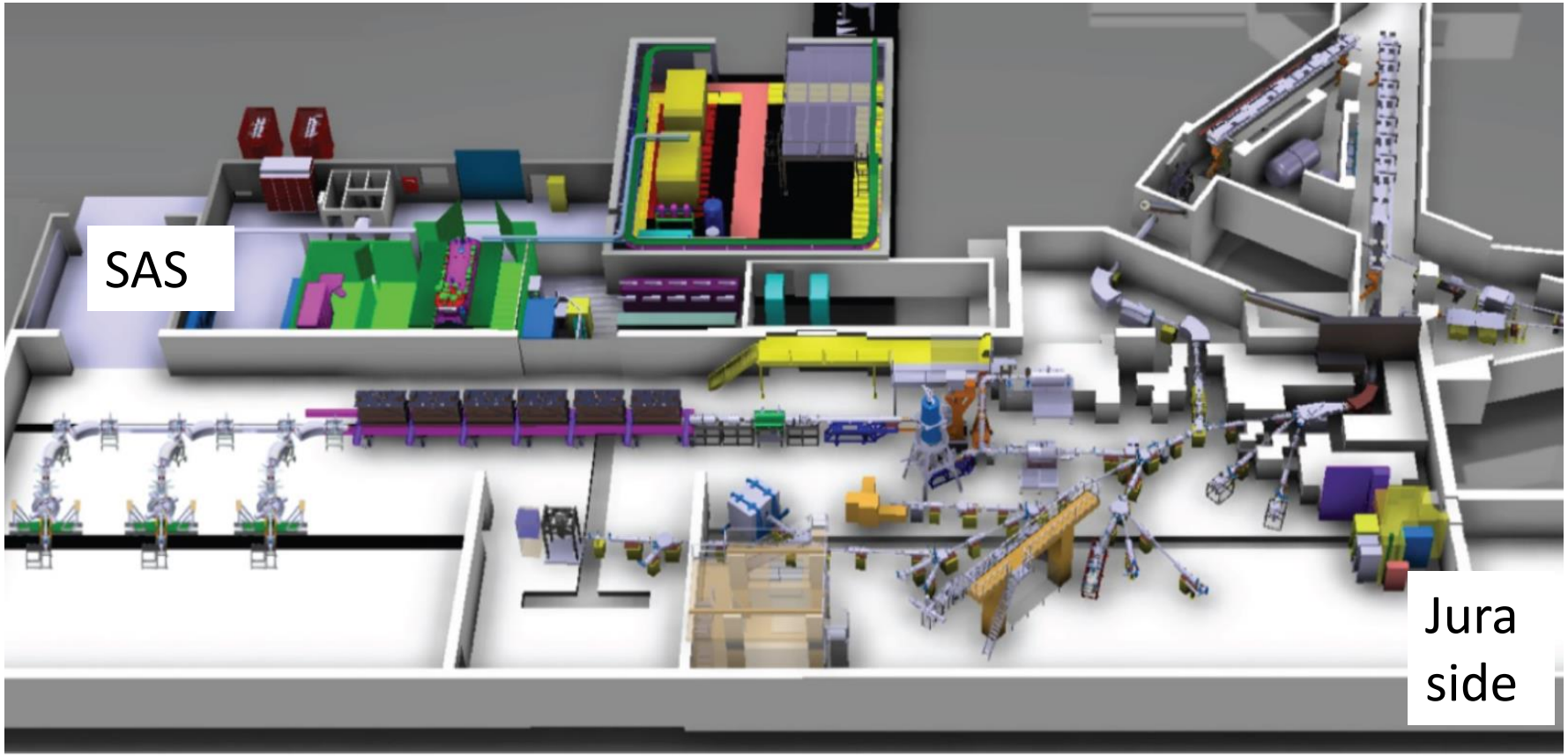
Going to change further…..probably some experiments have to be cut….or reduced shifts…more on HRS…

Activities in the hall….



Access to ISOLDE

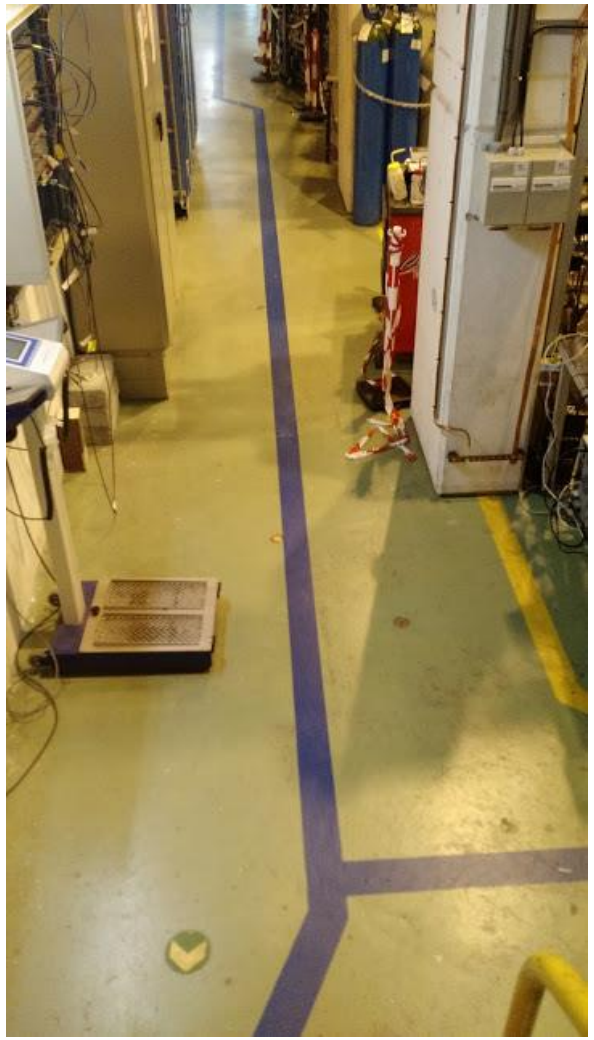
- ISOWORK has been suppressed. Now only **ISOHALL**.
- Access to HIE-ISOLDE recommended for only local physicists when moving equipment or dewars etc
- Access for users is still at the Jura side.
  - **Tourniquet at 508 controls access to the hall in addition to access door in Building 508. Both operated via dosemeter….time limit on the tourniquet of 3 mins..**

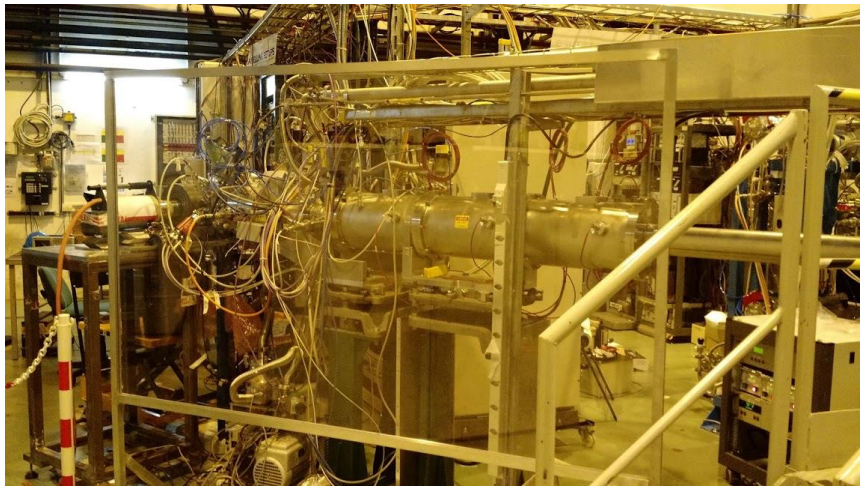


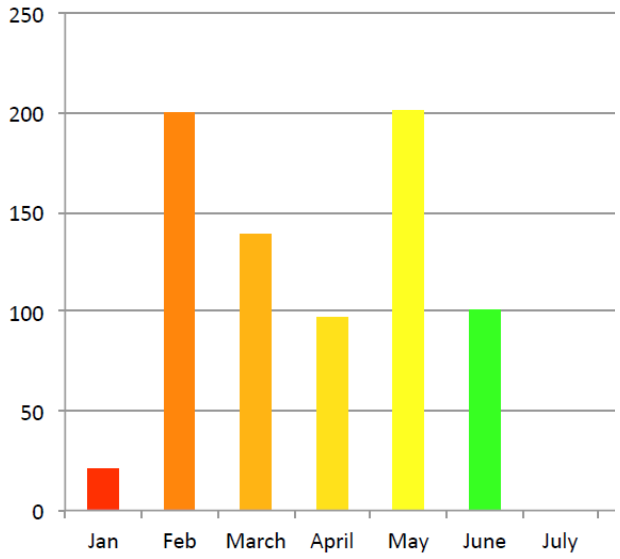
Safety and courses

- For all setups: fixed and travelling: safety clearance required before RUNNING
  - Travelling setups – template will be send some weeks before running, small safety visits/checks once setting up started
  - Contact your local contacts in case of questions
- Courses in 2016 for all: (as for 2015)
  - Online: general and ISOLDE RP, electrical awareness
  - 2-h ISOLDE RP (for everybody, not only new users and new dosimeter requests)
  - 1.5-h ISOLDE electrical safety.
  - Hands-on courses take place on Tuesday afternoons. May have more in the year if necessary e.g. during HIE-ISOLDE period.
  - Some training under review. Need for refreshing courses etc (probably going to be electronic for the first renewal at least).
  - **Courses need to be validated in EDH**
  - **Hands on course to be "hard-linked" from July 1st**
- Safety helmets and shoes required. For short term visitors building up a supply of spares…
- Adopt better practice for controlling on leaving the hall…please control yourself leaving

VISITS TO ISOLDE

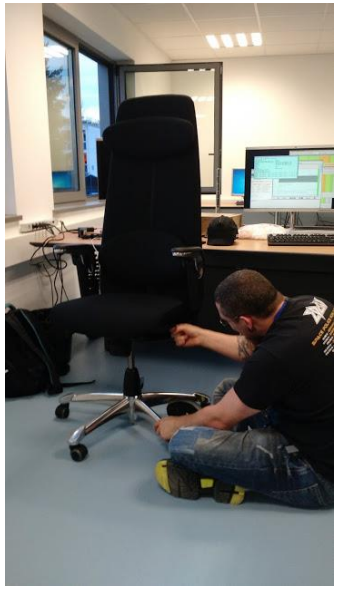






508: New control room

And kitchen….



275….