

# Constraints for scheduling of REX beam times

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# Beam setup tasks and time I

(fuzzy factor 0.5-2)

## ISOLDE setup

Day 0

- Separator setup
- Basic target test

(4 h)

(ISO operator + FW)

(2-3 h)

(ISO operator + FW)

what exact potential the ions are created at  
strange beam shapes  
beam composition, contaminations, pilot beam to use  
scale separator to correct voltage

Spill over

## REX setup

Day 1

- Find presetting with stable beam from EBIS through linac
- Beam from ISOLDE separator
- Beam through trap  
standard 2 h, molecular and noble gases 4-6 h
- Pilot beam injection into EBIS and REX separator

In parallel

(2-4 h)

(DV)

(1-3 h)

(operator / FW)

(2-6 h)

(FW)

(2-3 h)

(FW)

Day 2

- Optionally continued linac tuning with stable beam into exp chamber
- Determination of A/q, breeding times etc
- Radioactive beam to users  
depending on beam intensity and exp setup

(2-4 h)

(DV)

(2 h)

(FW)

(2-3 h)

(DV/FW)

Day 3

- General checks and further optimization of beam steering to experimental setup

(DV/FW)

# Beam setup tasks and time II

## In addition squeeze in (Day 0 to 2)

Proton scan on target

Yield tests if required and requested

(2-6 h)

(target specialists)

RILIS laser tuning with ISOLDE (if applicable)

(2 h)

(RILIS experts)

## During actual run

Change of isotope

0.5 - 4 h

(users, operators, DV/FW)

much depending on beam type, intensity, molecular

Change of energy

2-3 h

(DV/FW)

Optimization and verifications

(DV/FW)

\* Maintained momentum is the key!

## Other constraints

- Later startup in the spring than the rest of ISOLDE  
REX is competing for e.g. RF support with other machines such as Linac2 and Linac4 ↗
- support for RF and vacuum is still on a good will basis, i.e. no piquet  
(technical problem can cost a lot of time)
- Miniball availability
- Earlier a limitation of 9 runs per year; stated by AB at the time  
(only Thomas and Fredrik doing the operation)
- Still one specialist needed to be around – Didier or Fredrik
- Beam sharing of same separator is a nuisance  
(different separator voltages, magnet calibrations etc)
- Risky to deliver beam on Friday afternoon

# REX improvement list

## 1. more/better diagnostics = faster and easier set-up (mostly for linac)

- > energy/phase spread measurement after RFQ and directly behind the linac (TOF, Si detector)
- > calibrated beam profile/position monitors: improved MCP system and/or wire scanners
- > bunch length detector for slow extractions - 2011
- > ISOLDE tools for beam purity checks etc – under investigation

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## 2. Improve vacuum in separator and linac injection region

- > might solve a lot of transmission/scaling problems

## 3. Still suffer from unreliable not well tested or badly configured equipment

(e.g. collimators displaying wrong position, working-sets showing incorrect/misleading information, interlocks sending false alarms etc)

- > improve tools quality / pay attention to details (no 'bricolage')
- > written procedures, documentation?

# What to await from the future

- + REX getting easier – understanding increasing
- + Linac more or less scalable – speeds up things
- + Beam change by the users – tested successfully for the Pb run  
(alternative to goodwill bases for weekend changes)
- Dependent on CERN ‘standard’ solutions known by a single person
- Setting up HIE-ISOLDE – hope that scaling will work correctly...
- New cathode with improved life-time – limited progress, manpower clashes
- ? More beams scheduled already this year – outcome?
- ? WITCH and REX in co-operation
- ? Several beam times from one target – risk taking but saves time