

Beam Strategy Meeting

Tuesday, June 25, 2012, 15:00-16:15

Attending:

F. Ames, J. Behr, P. Bricault, A. Garnsworthy, R. Kruecken(chair), J. Lassen, L. Meringa, Ch. Ruiz

Excused:

J. Dilling

Minutes:

1. Targets in 2012 schedule:

The table below summarizes the beam development plans with the 2012 targets.

(Please note the added comments in red!)

Target	Ion Source	Target Module	Isotopes	P/LOI	Comment
0 SiC	FEBIAD	TM4	^{17,18} F	S946LOI(1), S1299LOI(2)	- Al(CH ₃) ₃ gas test – no improved F yields observed - CF ₄ gas test – ²³⁻²⁵ Al observed first time
1 Nb	SIS/RILIS	TM1	⁷⁸ Y ⁶⁰ Mn Zn ^{76,77} Rb Sc	S1326(H) S954LOI(2) S1144 (H)	Yield No Lols / P CSB Mn, Cu, Zn laser ionization successful No Sc observed
2 SiC	RILIS	TM4	^{26m} Al, ²⁶ Al	S989 (H), S1204 (H)	Dedicated target for ^{26m} Al >10⁶ pps ^{26m}Al at yield station achieved
3 Ta	SIS/RILIS	TM1	^{108,110,112}Sr	S1009LOI(2)	No beam development scheduled
4 UO ₂	CLT FEBIAD	TM4	^{19,20,22} CO ²⁶⁻³⁰ Ne	S1186LOI(1), S1187LOI(1), S1283LOI(1) S1240(H),	General development of the beams listed, TITAN and 8pi will take been when possible

				^{46,47,48} Ar Kr, Xe, Rn	S1283LOI(1) S1290(H)	
5	UCx	SIS/RILIS	TM1	¹³⁰⁻¹³⁷ Sn	S1187LOI(1)	yields for laser ionized Sn
6	NiO	FEBIAD	TM4	^{10,11} C	S1140LOI(1), S1073LOI(1), S983LOI(2)	First time carbon
7	Nb	SIS/RILIS	TM1			
8	UCx	FEBIAD no CLT	TM4	^{124,128} I ^{20,22} O Au-Po	S1292(M), S1066LOI(2) S1187LOI(1)	Yield (needs CSB) After irradiation
9	TiC or SiC	SIS/RILIS FEBIAD	TM1 Or TM3	K, ⁸ Li ^{17,18} F ^{18,19} Ne ¹⁴ O	S946LOI(1), S1299LOI(2) S870LOI(1), S811LOI(2), S874LOI(2), S1110LOI(2) S1140LOI(1), S1299LOI(2)	

(0) SiC/FEBIAD (last target in 2011 schedule)

During April 2012, the effects were investigated that CF₄ & Al(CH₃)₃ gas additions would have on yields of Al (as Al-¹⁹F+) & F (as ²⁷Al-F+) molecular beams with 70 uA proton beam. With CF₄ addition, the Al release was enhanced and yields of AlF+ beams were measured with Al nuclides from ²³Al through ²⁹Al. ^{23,24,25}Al had not been previously observed at ISAC.

Al	t1/2	Yield (/s)
22	70 ms	
23	0.47 s	2.0E+01
24	2.053 s	3.1E+03
25	7.183 s	3.3E+04
26m	6.3452 s	4.7E+04
28	2.2414 m	4.0E+04
29	6.56 m	2.0E+04

However, the results with Al(CH₃)₃ were inconclusive due to the apparent insufficient supply of material.

The next approach to produce increased F-beam intensity will involve including a Al or AlO disk in the target assembly, which would be evaporated and deliver Al vapor directly in the target, which is expected to increase the release of F.

(1) Nb: J.L. reported on the successful development of Mn, Cu, and Zn beams on the Nb target.

(4) UO2#3: P.B. informed the committee of the fact that the UO2 target with FEBIAD source will run without cold transfer line. This is a result of the change in the bias of FEBIAD extraction electrode which requires a new design for the cold transfer line. This design is not complete yet. Therefore the target will be operated without cold transfer line. This will increase contaminations for some species and overall widen the scope of elements that can be extracted.

The high priority yields that should be established from this target are neutron-rich carbon (as CO), neon, argon, krypton, and xenon beams as well as Rn yields. In view of the absence of a cold transfer line also iodine and astatine can be added to this list.

For the planned yield measurements the list of isotopes in the safety report for this target was referred to. However, this list is very extensive and not specific enough. In particular there is no schedule of the yield measurements included.

Action: Marik Dombsky together with Peter Kunz to provide the committee **by July 17** with a run plan for the yield measurements to be carried out during the scheduled beam development on UO2#3.

(9) TiC: It is the highest priority for the last target to run 37K beam for TRINAT. The TRINAT set-up is progressing well and no show-stoppers are anticipated from the experimental side. Production yields of 37K from a low power target should be sufficient to fulfill the experiments needs. 20 kV operation of the target module is sufficient to deliver beam to TRINAT (and beta-NMR). Other constraints for this runs are:

- TM4 is needed for the UCx/FEBIAD target (8)
- a low intensity run with maximum 40 microAmp proton beam is anticipated at the end of the year

Decision: The last target for 2012 will be a low power TiC target with Surface Ion Source for the production of 37K.

2. OLIS beams in 2012

Based on the experience with the detrimental effects observed for Sn and Se beams as well as the limited manpower available for source maintenance and beam development

it was felt that the tests with Se and Sn currently scheduled to start Aug 23 would possibly have a negative effect on pilot beam delivery for the RIB program following these tests.

Decision: The Se and Sn tests scheduled Aug. 23 – Sept. 9 will be removed from the schedule. If feasible, experiments with Ar-36 (S1232) and a charge state measurement for DRAGON with Be beam should be scheduled in Schedule 122 instead of these tests.

An assessment of the needs for changes to the OLIS infrastructure should be carried out. Part of this assessment was already performed.

Action: The **beam delivery group** should prepare a proposal for changes to OLIS to allow more beam development and a broader stable beam program that would be submitted to PPAC in the framework of the planning process for the next five-year plan.

3. Target Module 3

With TM1 being operational only with limited high voltage capabilities and TM4 having received record proton beam dose it is important to have another target module available. Work will be carried out to complete TM3 in the fall/winter 2012. A provision to install beam diagnostics elements on the target tray will be implemented. Mel Good has been made available for 1 month starting towards the end of July to help with TM3. P.B. reported that the existing tooling can be used to prepare TM3.

4. Report to TUG AGM and EEC

Reports have to be presented to the TUG AGM and the SAP-EEC in July on the progress of beam developments.

Action: Jens Lassen together with Peter Kunz to prepare ~3-5 slides **by July 6** for R.K. each on the achieved beam developments; i.e. measured yields, newly implemented RILIS schemes, other developments.

Action: Friedhelm Ames to discuss with other HMFT team members and identify team member to report on HMTF progress at upcoming ISAC Forum, date to be confirmed. A few slides summary to be provided to R.K. **by July 6**.

The EEC will be presented with the option to deliver 18F beams to TUDA from such a target. The already delivered 2e6 pps 18F should clearly be achievable with this set-up with a substantial potential for significantly higher yields.

Action: Pierre Bricault and Marik Dombisky to provide **by July 6** a few slides on the development of pure fluorine beams achieved in October 2011 and the plans to increase fluorine intensities further by mounting an aluminum disk inside the next SiC/FEBIAD target.

The results of the yield measurements from 2011 have been tabulated and sent to the MIS group. It was requested that updates of the yield database should be carried out by Peter Kunz.

Action: Reiner Kruecken to discuss with Glen Jones the transfer of control over the yield database to Peter Kunz.

5. RILIS RFQ

J.L. reported that work on the RILIS RFQ project is progressing. However, the project currently is currently about 4 weeks behind the original schedule.

June 25, 2012

Reiner Kruecken