Beam Strategy Meeting

Tuesday, May 1, 2012, 12:30-14:00

Attending:
F. Ames, J. Behr, P. Bricault, A. Garnsworthy, R. Kruecken(chair), J. Lassen, R. Laxdal, L. Merminga, Ch. Ruiz

Excused:
M. Dombsky, J. Dilling

Minutes:
PB reported on the tests with target SiC#26 that aimed at improving the extraction of F and Al beams.
The starting point for these tests is the already much improved extraction from SiC#26 due to going back to the normal biasing scheme for the extraction electrodes that had been used in SiC#16, which is a SiC target with exceptional yields. After SiC#16 the extraction voltages on the FEBIAD ion sources was switched to the anode. This was felt to be necessary since repeated temperature cycling of the target had led to a broken insulator. The changed bias of the extraction performed well on the test stand but was apparently not successful online. The switch to the original scheme for biasing the FEBIAD source extraction led to improved extraction yields from SiC#26.
On top of this improved performance tests were carried out with bleeding in CF_4 gas into the source and as a result for the first time it was possible to observe the molecules ^{23,24,25}AlF. Thus, Al beams without the usual strong Na contamination are possible.

Also a test was carried out with bleeding in $Al(CH_3)_3$ gas, which was supposed to increase F extraction yields. However, in this test no change in yields was observed for fluorine molecules.

Next possible improvements are planned by doping Si with Al, which could possibly lead to a faster formation and release of AlF molecules. Oak Ridge HRIBF has positive experience with this. Offline tests are planned to study the effects on the FEBIAD performance.

The plans for beam developments on the 2012 ISAC targets were discussed on the basis of the approved proposals and endorsed LoIs and the assessment by the beam delivery group of the best target/ion source combination and development needs.

The extensive list of assessments can be found in the following DocuShare collection: http://documents.triumf.ca/docushare/dsweb/View/Collection-7367

The choice of targets for 2012 was driven by the major goals for the science program and is summarized in the following table:

	Tgt	Ion Source	Main Purpose of target
0	SiC	FEBIAD	Release test for F, Al using CF_4 and $Al(CH_3)_3$ w/ target from 2011
1	Nb	SIS/RILIS	Develop CSB techniques with ^{76,77}Rb, b-NMR
2	SiC	RILIS	DRAGON, TUDA exp. w/ 26Al
3	Ta	SIS/RILIS	Beta-NMR, 11Be for ab-inito tests
4	UO_2	CLT FEBIAD	Development target w/ TITAN, 8p standby C for ab-inito, Ne, Ar for shell evolution
5	UC_x	SIS/RILIS	Shell evolution (Al,Mg K), Fr program
6	NiO	FEBIAD	Development target for ^{10}C (CKM), ^{11}C (Astro)
7	Nb	SIS/RILIS	Deliver accelerated ^{76}Rb from CSB to TIGRESS
8	UC_x	FEBIAD	New ion-source for UCx: n-rich O, At for RnEDM
9[#]	TiC or SiC	SIS/RILIS FEBIAD	^{37}K for improved TRINAT exp., beta-NMR F, Ne for Nucl. Astro; ^{14}O for CKM test

[#] choice for target 9 depends on successful TRINAT test on target 7

The tables below, summarize the plans for this year.

	Target	Ion Source	Target Module	Isotopes	P/LOI	Comment
0	SiC	FEBIAD	TM4	^{17,18}F	LS946(1), LS1299(2)	Al(CH3)3 gas test
1	Nb	SIS/RILIS	TM1	^{78}Y ^{60}Mn Zn ^{76,77}Rb	S1326(H) LS954(2) S1144 (H)	Yield No LoIs / P CSB
2	SiC	RILIS	TM4	^{26m}Al,^{26}Al	S989 (H), S1204 (H)	Dedicated target for ^{26m}Al

3	Ta	SIS/RILIS	TM1	^{108,110,112}Sn	LS1009(2)	Better from LaC?
4	UO_2	CLT FEBIAD	TM4	^{19,20,22}CO $^{26\text{-}30}$Ne ^{46,47,48}Ar Kr, Xe, Rn	LS1186(1), LS1187(1), LS1283(1) S1240(H), LS1283(1) S1290(H)	General development, TITAN and 8pi will take been when possible
5	UCx	SIS/RILIS	TM1	$^{130\text{-}137}$Sn	LS1187(1)	Contaminants?
6	NiO	FEBIAD	TM4	^{10,11}C	LS1140(1), LS 1073(1), LS983(2)	First time carbon
7	Nb	SIS/RILIS	TM1	Sc		
8	UCx	FEBIAD no CLT	TM4	^{124,128}I ^{20,22}O At Au-Po	S1292(M), LS1066(2) LS1187(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	LS946(1), LS1299(2) LS870(1), LS811(2), LS874(2), LS1110(2) LS1140(1), LS1299(2)	

Plans for 2013

A major development for 2013 is the implementation of the RILIS-RFQ as well as the use of a biased extraction electrode that can be pulsed synchronized with the laser pulse. This should provide major suppression of surface ionized contaminations, e.g. Fr in the case of At beams.

Another important development will be the use of a cold transfer line on a SiC target with FEBIAD source. This should improve the ionization efficiency for Ne beam. CR stated that the development of higher intensity Ne beams is more important for the astrophysics group than the development of 25Al beam.

Development of charge bread high-mass accelerated beams is another high priority for 2013. The development plans will build on the experience gained in 2012.

PB mentioned the plans to apply for NSERC funds to study the production of 44Ti with protons on V.

Action: RK to complete a summary list of beam development needs for communication to the user community.

May 19, 2012

Reiner Kruecken