

Update on physics priorities for target R&D

GUI meeting, November 13, 2007

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ISOLDE schedule 2007

ISOLDE dates 2007:

protons started April 16
 physics started April 20
 protons stopped Nov. 12

→ 29.5 weeks
 for physics

- 29 experiments (7 REX runs)
- 24 target units (3 old units)
- 12 UC_x targets (2 old units)

Apr		May					Jun						
Wk	14	15	16	17	18	19	20	21	22	23	24	25	26
Mo	2	Easter 9	16	Tech stop 23	IS442 ³⁰ I68 I64	IS442 ⁷	Stop PS 14	IS427 ²¹	Whitsun 28	Tech stop 4	11	IS397 ¹⁸	25
Tu				TISD	IS455	IS413	Stop PS		IS437	REX MD	IS453 IS443	IS441	IS390
We							Ascen				PS MD	(IS442)	I64
Th									IS413		IS442 IS443	IS434	IS413
Fr	G Friday		TISD	IS455	IS425	IS442 IS450 IS453	IS427	IS437	IS448		IS397		
Sa													
Su													

Jul			Aug				Sep						
Wk	27	28	29	30	31	32	33	34	35	36	37	38	39
Mo	2	9	IS439 ¹⁶	23	30	6	IS414 ¹³	20	TISD 27	IS400 ³	10	IS397 ¹⁷	24
Tu		IS451							Tech stop		IS424		IS410
We	PS MD		PS MD	IS442	IS411	IS456	IS414	IS452	IS413	Jeûne Gen			
Th													
Fr	IS451									IS445 (TISD)		IS409	
Sa		IS439	IS431 (coll)				IS452	IS442 (IS448)		IS424	IS397		IS417
Su													

Oct			Nov				Dec						
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52
Mo	1	8	15	22	29	5	12	19	26	3	10	17	24
Tu	IS410				Tech stop								Christmas
We													
Th		PS MD			IS454	ISCOOL							
Fr			ISCOOL installation										
Sa	IS425 (IS390)	IS433											
Su													

Stop protons 2007

TISD runs in 2007

Four dedicated
TISD runs:

- CaO / CP bivalve
- CaO / MiniMono
- HfO / MiniMono
- UCx / q n W RILIS



yield measurements
throughout the year

Apr		May					Jun							
Wk	14	15	16	17	18	19	20	21	22	23	24	25	26	
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Tu				TISD	IS455	IS413	Stop PS		IS437	REX MD	IS453 IS443		IS441	IS390
We							Ascen						IS441	IS390
Th													IS441	IS390
Fr	G Friday												IS441	IS390
Sa													IS441	IS390
Su			TISD	IS455	IS425	IS442	IS442 IS450 IS453	IS427	IS437	IS413	IS448	IS442 IS443	IS443	IS413

Jul			Aug				Sep						
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Tu		IS451							Tech stop				IS410
We	PS MD		PS MD				PS MD	IS452	IS413		IS424		IS410
Th			IS442	IS411	IS456	IS414				Jeune Gen			
Fr	IS451												
Sa		IS439	IS431				IS452	IS442	IS445	IS424	IS397	IS409	IS417
Su			(coll)				(IS448)	(TISD)					

Oct			Nov			Dec							
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52
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Tu	IS410				Tech stop								Christmas
We													
Th													
Fr													
Sa	IS425 (IS390)	IS433			IS454	ISCOOL							
Su	(coll)												

Stop protons 2007

Update of current priority list (I)

PRIORITY 1: Needs by approved experiments.

Target	Beam	Isotopes	Exp.		Time needed	Comments	Online	Offline	Responsible	User Exp. Contact	Status
UC _x	n-rich Cd		IS393 IS411 IS413	Decay REX ISOLTRAP		Cs and In contaminants. Quartz transfer line		X	Bouquerel	Kratz Krücken Blaum	UNDERWAY (2 nd prototype)
Ta – W	Li	¹¹ Li	IS399	REX		# Test ¹¹ Li @ REX # Repetition rate to 100 Hz [ok] # Synchronization # EBIS gases [ok]	X		REX	Fraile	UNDERWAY ~10 / min ¹¹ Li @ target
ZrO ₂ TiO free	⁶² Ga	⁶² Ga	IS406 (IS413)	ISOLTRAP TAGS		TiO free material to be tested	X		ISOLDE	Herlert	UNDERWAY
UC _x – HP (molecule) ThO – LIS (neutral)	n-rich Te	^{132, 134,} ¹³⁶ Te	IS411 IS415 IS428	REX COMPLIS		# Neutral vs. molecular beam. # RILIS (scheme to be tested...) # Quartz transfer [Cs retention].		X	Köster	Kröll Speidel Roussiére	UNDERWAY Thermochrom. Te RILIS scheme material
UC _x – W + CF ₄	n-rich Ba n-rich Sr		IS411 IS451	REX	Online test	Test BaF ⁺ production and breaking of molecules in REX	X		REX	Krücken Clément	UNDERWAY Test online 2007
UC _x	Short lived Ni	⁶⁶ Ni	IS412	REX ISOLTRAP	2 shifts with IS412	Ni RILIS, Carbon coated target. Also ⁶⁶ Ni implantations Low yields	X		Köster / Catherall	Van Duppen	UNDERWAY
SiC – W	F / AlF – LaF	¹⁷ F	IS424	REX		LaF+ <i>molecule injection</i> , F+ (stripper foils), AlF+ (+CO ₂ contaminants)	X		Fernandes REX	Woods	UNDERWAY Tested: ~10 ⁻² s ⁻¹ ¹⁷ F @ MINIBALL
Ti foil Si “foil” SiC	n-def. Mg	²² Mg, ²³ Mg	IS427 IS413	ISOLTRAP COLLAPS TARGISOL		RILIS tests ²² Mg, (~10 ⁶ ions/μC for 20 g/cm ² target with ²² Na up to 10 ⁸ ions/μC) Si higher cross sections than Ti	X	X	Mainz Köster	Herlert	UNDERWAY COLLAPS [ISOLTRAP ok]
CeO – HP	n-def. Te	¹¹²⁻¹²¹ Te	IS428	COMPLIS		Tested → slow unit	X		ISOLDE	Roussiére	UNDERWAY
Negative ion sources	Br	⁸² Br, ⁸³ Br	IS431 IS9	NICOLE Decay spec.	2/3 weeks	Change of polarities [ok] Comparison of negative sources	X	X	Menna Catherall	Severijns Blank	UNDERWAY Test of new materials
LaB ₆	I, Cl, At?	⁷⁰ Br ...			GPS	KENIS, materials...					
MiniMono ion source	C beams N, O Noble gases	⁹ C, n- rich C O	IS445 (IS420) (IS413)	Decay REX	Offline test	Improvement of Ionization efficiency for He, Ne New materials HfO	X	X	Franberg Wenander	Fynbo Jeppesen	UNDERWAY Test online 2007
Pb	^{182, 184} Hg	^{182, 184} Hg	IS452	REX	Online test	Charge breeding successfully tested offline	X	X	Wenander	Butler Van Duppen	UNDERWAY
NiO/Cr ₂ O ₃ / CrC _x	n-def. Mn	⁴ Mn	P94	Spec.		Release measurements to be performed	X	X	Köster	Jokinen	On hold

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Ta - W	Li	¹¹ Li	IS399	REX	# Test ¹¹ Li @ REX # Repetition rate to 100 Hz [ok] # Synchronization # EBIS gases [ok]	X		REX	Fraile	UNDERWAY ~10 / min ¹¹ Li @ target
ZrO ₂ TiO free	⁶² Ga	⁶² Ga	IS406	TAGS	TiO free material to be tested	X		ISOLDE	Herlert	LIST ?
UC _x - HP (molecule) ThO - LIS (neutral)	n-rich Te	^{132, 134, 136} Te	IS411 IS415	REX	# Neutral vs. molecular beam. # RILIS (scheme to be tested...) # Quartz transfer [Cs retention].		X	Köster	Kröll Speidel Roussiére	UNDERWAY Thermochrom. Te RILIS scheme material
UC _x - W + CF ₄	n-rich Ba n-rich Sr		IS411 IS451	REX	Online test Test BaF ⁺ production and breaking of molecules in REX	X		REX	Krücken Clément	test not ok
UC _x	Short lived Ni	⁶⁶ Ni	IS412	REX ISOLTRAP	2 shifts with IS412 Ni RILIS, Carbon coated target. Also ⁶⁶ Ni implantations Low yields	X		Köster / Catherall	Van Duppen	UNDERWAY
SiC - W	F / AlF - LaF	¹⁹ F	IS424	REX	LaF+ molecule injection, F+ (stripper foils), AlF+ (+CO ₂ contaminants)	X		Fernandes REX	Woods	DONE
Ti foil Si "foil" SiC	n-def. Mg	²² Mg ²³ Mg	IS427 IS413	ISOLTRAP COLLAPS TARGISOL	RILIS tests ²² Mg, (~10 ⁶ ions/μC for 20 g/cm ² target with ²² Na up to 10 ⁸ ions/μC) Si higher cross sections than Ti	X	X	Mainz Köster	Herlert	UNDERWAY DONE
CaO - HP	n-def. Te	¹¹²⁻¹²¹Te	IS428	COMPLIS	Tasted → slow unit	X		ISOLDE	Roussiére	UNDERWAY
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LaB ₆	I, Cl, At?	⁷⁰ Br ...		GPS	KENIS, materials...					need off-line test
MiniMono ion source	C beams N, O Noble gases	⁹ C, n-rich C O	IS445 (IS420) (IS413)	Decay REX	Offline test Improvement of Ionization efficiency for He, Ne New materials HfO	X	X	Franberg Wenander	Fynbo Jeppesen	test failure
Pb	^{182, 184} Hg	^{182, 184} Hg	IS452	REX	Online test Charge breeding successfully tested offline	X	X	Wenander	Butler Van Duppen	DONE
NiO/Cr ₂ O ₃ /CrC _x	n-def. Mn	⁴ Mn	P94	Spec.	Release measurements to be performed	X	X	Köster	Jokinen	On hold

Update of current priority list (II)

PRIORITY 2: Letters of intent. Improvements for approved experiments.

Target	Beam	Isotopes	Experiment		Time needed	Comments	Online	Offline	Responsible	User Exp. Contact	Status
SiC	Al	$^{25-26m}\text{Al}$	I63			SiC and other materials	X	X	Fernandes	Cederkall	UNDERWAY
UC _x – MK5	Ge beams	$^{78,80,82}\text{Ge}$	I58	REX		LoI February 2005 <i>GeS molecules</i>	X	X	REX	Stefanescu	On hold

PRIORITY 3: Research and development.

Target	Beam	Isotopes	Experiment / Request		Time needed	Comments	Online	Offline	Responsible	User Exp. Contact	Status
LIST	RILIS		TISD			Alkali suppression + RILIS			Wendt / Fedosseev	—	Underway
Several			TISD	Vibrometer	3 shifts	Stress waves			Wilfinger	—	Underway
Light (MgO) Bi-valve			TISD	EURISOL & ISOLDE		Development of multi transfer line targets	X	X	ISOLDE AB	—	Underway
Various standard	Various	Various	TISD	EURISOL		R&D in the framework of EURISOL-DS	X	X	ISOLDE AB	—	Underway
Negative ion sources	Halogen s et al.	Various	TISD			Development and comparison of negative ion sources		X	Menna	—	Underway
Various			TISD			Studies of nanomaterials		X	ISOLDE AB	—	Underway

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Target	Beam	Isotopes	Experiment		Time needed	Comments	Online	Offline	Responsible	User Exp. Contact	Status
SiC	Al	$^{25-26m}\text{Al}$	I63			SiC and other materials	X	X	Fernandes	Cederkall	<div style="color: red; font-weight: bold; text-align: center;"> poor yield IS458/P225? </div>
UC _x – MK5	Ge beams	$^{78,80,82}\text{Ge}$	I58	REX		LoI February 2005 <i>GeS molecules</i>	X	X	REX	Stefanescu	

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LIST	RILIS		TISD			Alkali suppression + RILIS			Wendt / Fedosseev	—	Underway
Several			TISD	Vibrometer	3 shifts	Stress waves			Wilfinger	—	Underway
Light (MgO) Bi-valve			TISD	EURISOL & ISOLDE		Development of multi transfer line targets	X	X	ISOLDE AB	—	Underway
Various standard	Various	Various	TISD	EURISOL		R&D in the framework of EURISOL-DS	X	X	ISOLDE AB	—	Underway
Negative ion sources	Halogen s et al.	Various	TISD			Development and comparison of negative ion sources		X	Menna	—	Underway
Various			TISD			Studies of nanomaterials		X	ISOLDE AB	—	Underway

Target and Ion Source R&D (last meeting)

Priority 1

- **IS451:** SrF⁺ REX
- **IS452:** Hg REX
- **IS413:** (Add): ¹⁴O
- **P225:** Ge/Se beams
- **P228:** ⁷²Kr [not recommended, but INTC requests high priority]
- **P231:** LIST - ⁶²Ga
- **P232:** Fr suppression (Hg/Tl)

Priority 2

- **P230:** Rare earth beams (fluorides) for mass measurements
- **I70:** ⁴⁴Ti

Priority 3

- Negative beams (³⁰S) combined with ISCOOL

Target and Ion Source R&D (last meeting)

Priority 1

- **IS451**: SrF⁺ REX **TESTED** (NOT OK)
- **IS452**: Hg REX **DONE**
- **IS413**: (Add): ¹⁴O
- **IS458**: Ge/Se/Sr molecular beams **PARTLY TESTED** (NOT OK)
- **P228**: ⁷²Kr [not recommended, but INTC requests high priority]
- **IS462**: LIST - ⁶²Ga
- **IS463**: Fr suppression (Hg/Tl) **TESTED** (UCx quartz)

Priority 2

- **IS461**: Rare earth beams (fluorides) for mass measurements
- **I70**: ⁴⁴Ti **UNDERWAY**

Priority 3

- **I71**: Negative beams (³⁰S) combined with ISCOOL

Target and Ion Source R&D (additions)

Priority 1

- **IS459/P227**: Yield measurement for $^{105,107}\text{Sn}$
- **IS433**: purification of ^{35}Ar beam (observed large ^{35}Cl contamination during 2007 run with CaO / CP target)
- **IS435**: reduction of ^{75}Ga background in ^{75}Cu beam
- **IS411**: ^{148}Ba , reduction of contaminations

Priority 2

- **P226**: Yield measurement for ^{128}Cd
- **I51**: ^{22}Mg beam, cleaning of ^{22}Na (+ REX cleaning)

Priority 3

- UC_x target development and temperature controlled transfer (trapping material screening, i.e. other elements to be frozen out)

ISOLDE dates

protons from PSB May 5
 physics start ISOLDE May 9
 protons stop November 10

(not confirmed yet - changes due to LHC operation possible)

