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## AVAILABLE STABLE ION BEAMS AT GANIL

At GANIL since 1983, stable beams are produced and accelerated to physics experiments. In the following, you will find the complete list of ions produced at the source (TABLE N°1). This Table recalls the method of production and the availability of the compound sample at GANIL.

In TABLE N°2 is detailed the characteristics of the accelerated beams with informations about intensities and developments.

### Contacts:

Any development demand must be addressed to the following groups:

**Operation:** [chautard@ganil.fr](mailto:chautard@ganil.fr); [jacquot@ganil.fr](mailto:jacquot@ganil.fr); [patard@ganil.fr](mailto:patard@ganil.fr)

**Source:** [leherissier@ganil.fr](mailto:leherissier@ganil.fr); [lemagnen@ganil.fr](mailto:lemagnen@ganil.fr)

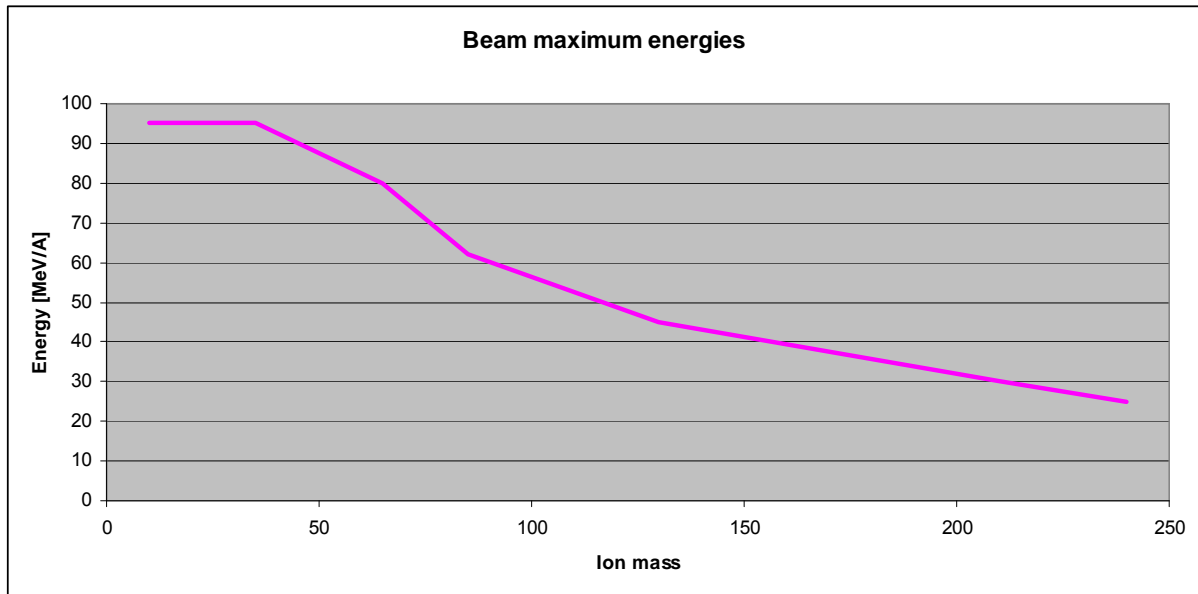
### Ion species

In **table n°1** are gathered the ions produced at GANIL with the ECR ion sources and their production methods (gas, oven, mivoc, rod or sputtering).

Some of the beams can be produced only if isotopically enriched. These isotopes are usually not available at GANIL. The physicist in charge of the experiment will have to bring the enriched sample. He will contact the Operation Group several months before the experiment, in order to determine the physical (gas or solid) and chemical form of the sample required and the necessary amount (which might depend on the needed intensity).

### Energy

As an indication the following curve gives the maximum energy reachable for an ion mass. This maximum energy depends on the ion charge state, and might have an incidence on the intensity. For instance, the choice of a higher energy than indicated on the curve is possible, but usually with a reduced intensity. In any case, 95 MeV/A is the upper limit.



## BEAM CHARACTERISTICS

For nominal tunings, without any intensity reduction, the beam characteristics on the experiment target are the following:

Total emittance (H and V):  $10 \pi$  mm.mrad for CSS1 beam

$5 \pi$  mm.mrad for CSS2 beam

Energy spread  $\Delta W/W$  (half-height):  $= \pm 2 \cdot 10^{-3}$

Pulse time length  $\Delta t$  (half-height):  $= \pm 1.5$  % of the RF period

The emittance and energy spread can be reduced, by using slits in the alpha spectrometer, this tuning giving, of course, an intensity reduction.

The pulse time length can also be reduced, but this tuning being much more delicate, a discussion with the Operation Group is recommended before the experiment.

## HIGH INTENSITY BEAMS (POWER > 400 W)

Several beams are available with intensities higher than 400 W, typically gaseous beams (and some "metallic" beams) for secondary beam production and for SPIRAL experiments. The [Radiation Safety Office](#) defines for each experimental area the maximum beam intensity depending on energy and mass of the ions.

## MEDIUM ENERGY BEAMS

It is possible to send the beam coming directly from CSS1 to the experimental areas, passing through the alpha spectrometer and send a beam to the Medium Energy Exit (SME) using an "unused" charge state after the stripper.

## TABLE N°1

### GANIL SOURCE PRODUCTION

ION		PRODUCTION METHOD	COMPOUND	SAMPLE AVAILABLE AT GANIL
type	masse			
C	12	GAS	CO <sub>2</sub> - CH <sub>3</sub>	YES
C	13	GAS	CO <sub>2</sub> - CH <sub>3</sub>	YES
N	14	GAS	N <sub>2</sub>	YES
N	15	GAS	N <sub>2</sub>	YES
O	16	GAS	O <sub>2</sub>	YES
O	17	GAS	O <sub>2</sub>	YES
O	18	GAS	O <sub>2</sub> - CO <sub>2</sub>	YES
F	19	GAS	SF <sub>6</sub>	YES
Ne	20	GAS	Ne	YES
Ne	22	GAS	Ne	YES
Mg	24	MIVOC/OVEN	Mg / MgC <sub>10</sub> H <sub>10</sub>	YES
Si	28	GAS	SiH <sub>4</sub>	YES
S	32	GAS	SF <sub>6</sub>	YES
S	36	GAS	SF <sub>6</sub>	YES
Ar	36	GAS	Ar	YES
Ar	40	GAS	Ar	YES
Ca	40	OVEN	Ca	YES
Ca	48	OVEN	Ca - CaO	NO
Cr	50	OVEN	Cr	NO
Cr	52	OVEN	Cr	YES
Cr	54	OVEN	Cr	YES
Fe	56	MIVOC	FeC <sub>10</sub> H <sub>10</sub>	YES
Ni	58	MIVOC/OVEN	NiC <sub>10</sub> H <sub>10</sub> /NiO/Ni	YES
Ni	64	MIVOC/OVEN	NiC <sub>10</sub> H <sub>10</sub> /NiO/Ni	NO
Cu	65	OVEN	Cu	NO
Zn	64	OVEN	Zn	YES
Zn	70	OVEN	Zn	NO
Ge	74	OVEN+recycling SF <sub>6</sub>	GeO <sub>2</sub>	NO
Ge	76		GeO <sub>2</sub>	NO
Se	80	OVEN	Se	YES
Kr	78	GAS	Kr	YES
Kr	84	GAS	Kr	YES
Kr	86	GAS	Kr	YES
Nb	93	ROD/SPUTTERING	Nb	YES
Mo	92	OVEN	MoO <sub>3</sub>	YES
Mo	96	OVEN	MoO <sub>3</sub>	YES
Ag	107	OVEN	Ag	YES
Ag	109	OVEN	Ag	YES

ION		PRODUCTION METHOD	COMPOUND	SAMPLE AVAILABLE AT GANIL
type	masse			
<b>Cd</b>	106	OVEN	CdO	NO
<b>Sn</b>	112	OVEN	Sn/SnO	NO
<b>Sn</b>	116	OVEN	Sn/SnO	NO
<b>Xe</b>	124	GAS	Xe	NO
<b>Te</b>	125	OVEN	Te	NO
<b>Xe</b>	129	GAS	Xe	YES
<b>Xe</b>	132	GAS	Xe	YES
<b>Xe</b>	136	GAS	Xe	NO
<b>Sm</b>	154	ROD	Sm <sub>2</sub> O <sub>3</sub>	NO
<b>Gd</b>	155	ROD	Gd <sub>2</sub> O <sub>3</sub>	NO
<b>Gd</b>	157	ROD	Gd <sub>2</sub> O <sub>3</sub>	NO
<b>Gd</b>	158	ROD	Gd <sub>2</sub> O <sub>3</sub>	NO
<b>Ta</b>	181	ROD/SPUTTERING	Ta	YES
<b>Pb</b>	208	OVEN	Pb	YES
<b>U</b>	238	SPUTTERING	U	YES

## TABLE N°2:

# ACCELERATED BEAMS WITH THEIR CHARACTERISTICS

### (Updated 2009)

- The intensities correspond to a given energy. For a new energy a study must be done (see contacts above).

- The beams coming from CSS1 are available for the SME (Medium Energy Exit), with energies from 3.9 to 13.7 MeV/A. They can also be sent directly to all the experimental areas.

- In Pink color, the beam has still not been accelerated but can theoretically be

: Beams done and accelerated

: Tested at the ion source and extrapolated, still not done for an experiment

#### Recommendations:

Be aware that the Radiation Safety Office defines for each experimental area the maximum beam intensity depending on energy and mass of the ions.

The transport of **high power** beams needs to check that the experimental room can handle this beam power (radioprotection, thermal limit...)

- Limit for spiral target: 3 kW for He<sup>6,8\*</sup> production, 1.5 kW for the others;
- Limit for LISE (D3): Contact the scientific coordinator of LISE at GANIL.

ION		FINAL ENERGY		CHARGE STATE			Accelerators		FINAL INTENSITY		FINAL power	SME INTEN.	comments
				q	q	q							
type	A	MeV/A		source	final	Sme			μA	pps	kWatt	μA	limits, difficulties
<b>C</b>	12	95	MeV/A	4	6	5	c02	css1+css2	4,3	4,5 10 <sup>12</sup>	0,8	0,76	High power
<b>C</b>	12	95	MeV/A	4	6	5	c01	css1+css2	19	19,8 10 <sup>12</sup>	3,6	3,35	High power
<b>C</b>	13	35	MeV/A	2	6	5	c01	css1+css2	5,2	5,4 10 <sup>12</sup>	0,4	0,92	High power
<b>C</b>	13	75	MeV/A	3	6	5	c01	css1+css2	18	18,8 10 <sup>12</sup>	2,9	3,18	High power
<b>C</b>	13	75	MeV/A	3	6	6	c02	css1+css2	10	10,4 10 <sup>12</sup>	1,6	1,76	High power
<b>N</b>	14	95	MeV/A	3	7	6	c01	css1+css2	18	16,1 10 <sup>12</sup>	3,4	3,18	High power
<b>O</b>	16	95	MeV/A	5	8	7	c02	css1+css2	15	11,7 10 <sup>12</sup>	2,9	2,65	High power
<b>O</b>	16	95	MeV/A	5	8	7	c02	css1+css2	6,9	5,4 10 <sup>12</sup>	1,3	1,22	
<b>O</b>	18	75	MeV/A	4	8	7	c01	css1+css2	2,3	1,8 10 <sup>12</sup>	0,4	0,41	
<b>O</b>	18	30	MeV/A	2	8	7	?	css1+css2	5,9	4,6 10 <sup>12</sup>	0,4	1,04	High power
<b>Ne</b>	20	95	MeV/A	6	10	9	c01	css1+css2	15,7	9,8 10 <sup>12</sup>	3,0	2,40	High power

ION		FINAL ENERGY		CHARGE STATE			Accelerators		FINAL INTENSITY		FINAL power	SME INTEN.	comments limits, difficulties
type	A	MeV/A	q	q	q			$\mu\text{A}$	pps	kWatt	$\mu\text{A}$		
			source	final	Sme								
Ne	20	95 MeV/A	6	10	9	c02	css1+css2	10	$6,3 \cdot 10^{12}$	1,9	1,53	High power	
Ne	22	30 MeV/A	3	9	8	c02	css1+css3	10	$6,9 \cdot 10^{12}$	0,7	2,31	High power	
Ne	22	80 MeV/A	7	10	9	c01	css1+css2	15	$9,4 \cdot 10^{12}$	2,6	2,29	High power	
Mg	24	70 MeV/A	5	12	11	c01	css1+css2	1	$0,5 \cdot 10^{12}$	0,1	0,12	old method	
Mg	24	95 MeV/A	7	12	11	c01	css1+css2	1,5	$0,8 \cdot 10^{12}$	0,3	0,23	old method	
Mg	24	95 MeV/A	5	12	11	c01	css1+css2	20	$10,4 \cdot 10^{12}$	3,8	3,06	new Result	
Mg	26	80 MeV/A	6	12	11	c01	css1+css2	17	$8,9 \cdot 10^{12}$	2,9	2,00	new Result	
S	32	95 MeV/A	9	16	15	c01	css1+css2	4,1	$1,6 \cdot 10^{12}$	0,8	0,48		
S	36	50 MeV/A	7	16	15	c02	css1+css2	5	$2,0 \cdot 10^{12}$	0,6	2,67		
S	36	77,5 MeV/A	8	16	15	c01	css1+css2	11	$4,3 \cdot 10^{12}$	1,9	2,17	High power	
Ar	36	27,1 MeV/A	4	16	15	?	css1+css2	5	$2,0 \cdot 10^{12}$	0,3	8,13		
Ar	36	4,9 MeV/A	6	6	-	?	css1	2,5	$2,6 \cdot 10^{12}$	0,1	0,00		
Ar	36	95 MeV/A	10	18	17	c01	css1+css2	24	$8,3 \cdot 10^{12}$	4,6	11,08	High power	
Ar	36	95 MeV/A	10	18	17	c02	css1+css2	10,5	$3,6 \cdot 10^{12}$	2,0	4,85	High power	
Ar	40	35 MeV/A	6	17	16	c02	css1+css2	4,6	$1,7 \cdot 10^{12}$	0,4	2,72		
Ca	40	5 MeV/A	6	6		c02	css1+css2	0,5	$0,5 \cdot 10^{12}$	0,0	0,00		
Ca	40	95 MeV/A	9	20	19	c02	css1+css2	4	$1,3 \cdot 10^{12}$	0,8	2,16		
Ca	48	4,5 MeV/A	8	8	-	c01	css1	2	$1,6 \cdot 10^{12}$	0,1	0,00		
Ca	48	6,56 MeV/A	8	8	-	c01	css1	2	$1,6 \cdot 10^{12}$	0,1	0,00		
Ca	48	60,3 MeV/A	10	19	18	c01	css1+css2	4,5	$1,5 \cdot 10^{12}$	0,7	1,88		
Cr	50	58 MeV/A	11	22	21	c01	css1+css2	0,45	$0,1 \cdot 10^{12}$	0,1	0,14		
Cr	50	82 MeV/A	13	23		c01	css1+css2	0,6	$0,2 \cdot 10^{12}$	0,1	0,14		
Cr	52	75 MeV/A	10	23	21	c02	css1+css2	0,8	$0,2 \cdot 10^{12}$	0,1	0,33		
Cr	54	4,75 MeV/A	8	8	-	c01	css1	0,4	$0,3 \cdot 10^{12}$	0,0	0,00		
Fe	56	9,7 MeV/A	10	25	24	c02	css1	2	$0,5 \cdot 10^{12}$	0,0	4,00		
Fe	57	9,7 MeV/A	10	25	24	c02	css1	2	$0,5 \cdot 10^{12}$	0,0	3,13		
Ni	58	74,5 MeV/A	11	26	24	c02	css1+css2	4	$1,0 \cdot 10^{12}$	0,7	0,14		
Ni	58	90 MeV/A	15	28	26	c01	css1+css2	0,1	$0,0 \cdot 10^{12}$	0,0	0,24		
Ni	58	4 MeV/A	9	24	23	c02	Css1	0,8	$0,2 \cdot 10^{12}$	0,0	0,80		
Ni	58	6,6 MeV/A	9	9	9	c02	Css1	1,6	$1,1 \cdot 10^{12}$	0,1	0,00		
Ni	64	55 MeV/A	11	26	24	c01	css1+css2	3,5	$0,8 \cdot 10^{12}$	0,5	0,90		
Ni	64	55 MeV/A	10	26	24	C02	css1+css2	1,5	$0,4 \cdot 10^{12}$	0,2	0,38		
Ni	64	64,6 MeV/A	11	26	24	c02	css1+css2	3,8	$0,9 \cdot 10^{12}$	0,6	0,32		
Zn	64	74 MeV/A	13	28	27	c01	css1+css2	1,2	$0,3 \cdot 10^{12}$	0,2	0,12	28+ better than 29+	
Zn	64	79 MeV/A	13	29	27	c01	css1+css2	0,5	$0,1 \cdot 10^{12}$	0,1	0,63		
Zn	70	66 MeV/A	15	29	27	c01	css1+css2	0,4	$0,1 \cdot 10^{12}$	0,1	0,93	I(28+) > I(29+)	
Zn	70	62,5 MeV/A	14	28	26	c01	css1+css2	1,6	$0,4 \cdot 10^{12}$	0,3	0,30		

ION		FINAL ENERGY MeV/A	CHARGE STATE			Accelerators	FINAL INTENSITY		FINAL power kWatt	SME INTEN. μA	comments limits, difficulties	
type	A		q	q	q		μA	pps				
			source	final	Sme							
Ge	70	71,8 MeV/A	13	30	28	c01	css1+css2	3,3	0,7 10 <sup>12</sup>	0,6	0,83	
Ge	76	5 MeV/A	10	10	-	c01	css1	8,5	5,3 10 <sup>12</sup>	0,3	0,00	
Ge	76	61,1 MeV/A	13	30	28	c01	css1+css2	3,5	0,7 10 <sup>12</sup>	0,5	1,50	
Ge	76	59,6 MeV/A	13	30	28	c02	css1+css2	2	0,4 10 <sup>12</sup>	0,3	1,03	
Kr	78	64 MeV/A	15	32	30	c02	css1+css2	1,8	0,4 10 <sup>12</sup>	0,3	0,45	
Kr	78	70,4 MeV/A	15	33	31	c01	css1+css2	7	1,3 10 <sup>12</sup>	1,2	1,14	High power
Kr	78	73 MeV/A	16	34	32	c02	css1+css2	2	0,4 10 <sup>12</sup>	0,3	1,09	
Kr	86	57,9 MeV/A	14	33	31	c01	css1+css2	4,4	0,8 10 <sup>12</sup>	0,7	1,55	
Kr	86	5,27 MeV/A	10	10	10	c01	css1	14	8,8 10 <sup>12</sup>	0,6	0,00	
Kr	86	60,3 MeV/A	15	34	32	c02	css1+css2	1,2	0,2 10 <sup>12</sup>	0,2	1,80	
Mo	92	60 MeV/A	16	37	35		css1+css2	0,25	0,04 10 <sup>12</sup>	<0,1	0,04	
Nb	93	25 MeV/A	13	31	29		css1+css2	0,2	0,04 10 <sup>12</sup>	<0,1	0,07	
Nb	93	31 MeV/A	14	33	31		css1+css2	0,2	0,04 10 <sup>12</sup>	<0,1	0,11	
Nb	93	56 MeV/A	16	36	34		css1+css2	0,2	0,03 10 <sup>12</sup>	<0,1	0,07	
Cd	106	66,5 MeV/A	21	44	42		css1+css2	0,15	0,02 10 <sup>12</sup>	<0,1		
Ag	107	36,4 MeV/A	18	38	36		css1+css2	0,3	0,05 10 <sup>12</sup>	<0,1		
Ag	107	52 MeV/A	19	40	38		css1+css2	0,3	0,05 10 <sup>12</sup>	<0,1	0,12	
Ag	109	35 MeV/A	18	38	36		css1+css2	0,1	0,02 10 <sup>12</sup>	<0,1		
Sn	112	57,9 MeV/A	17	43	41		css1+css2	0,2	0,03 10 <sup>12</sup>	<0,1		
Sn	112	63 MeV/A	22	45	43	c01	css1+css2	0,2	0,03 10 <sup>12</sup>	<0,1	0,32	
Sn	116	25 MeV/A	16	37	35	c01	css1+css2	0,2	0,03 10 <sup>12</sup>	<0,1	0,13	
Sn	116	30 MeV/A	16	38	36		css1+css2	0,2	0,03 10 <sup>12</sup>	<0,1		
Te	125	25 MeV/A	17	38	36		css1+css2	0,05	0,01 10 <sup>12</sup>	<0,1		
Te	125	27 MeV/A	17	38	36		css1+css2	0,05	0,01 10 <sup>12</sup>	<0,1		
I	127	6 MeV/A	18	18	-	c01	css1	0,45	0,16 10 <sup>12</sup>	<0,1	0,00	test done in 2009
I	127	49,5 MeV/A	18	45	43	c01	css1+css2	0,23	0,03 10 <sup>12</sup>	<0,1	0,23	test done in 2009
Xe	124	45 MeV/A	18	44	42	c01	css1+css2	0,27	0,04 10 <sup>12</sup>	<0,1	0,11	
Xe	124	49,6 MeV/A	18	44	42	c02	css1+css2	1,4	0,20 10 <sup>12</sup>	0,2	0,48	
Xe	124	49,6 MeV/A	18	44	42	c01	css1+css2	1,8	0,26 10 <sup>12</sup>	0,3	0,62	
Xe	129	27 MeV/A	14	37	35		css1+css2	0,5	0,08 10 <sup>12</sup>	<0,1		
Xe	129	0,27 MeV/A	15	15	-	c01	-	6	2,50 10 <sup>12</sup>	<0,1	0,00	
Xe	129	30 MeV/A	15	38	36		css1+css2	0,5	0,08 10 <sup>12</sup>	0,1		
Xe	129	30,7 MeV/A	15	41	39		css1+css2	1,8	0,27 10 <sup>12</sup>	0,2		
Xe	129	35 MeV/A	17	42	40	c01	css1+css2	0,6	0,09 10 <sup>12</sup>	0,1	0,49	
Xe	129	44 MeV/A	18	44	42		css1+css2	2	0,3 10 <sup>12</sup>	0,3	1,00	
Xe	129	50 MeV/A	19	46	44		css1+css2	2	0,27 10 <sup>12</sup>	0,3	3,71	

ION		FINAL ENERGY MeV/A	CHARGE STATE			Accelerators		FINAL INTENSITY		FINAL power kWatt	SME INTEN. μA	comments limits, difficulties	
type	A		q	q	q			μA	pps				
			source	final	Sme								
<b>Xe</b>	132	34,4 MeV/A	18	42	40		css1+css2	1,5	0,22 10 <sup>12</sup>	0,2			
<b>Xe</b>	136	45,4 MeV/A	19	46	44	C01	css1+css2	1,6	0,22 10 <sup>12</sup>	0,2	3,08		
<b>Xe</b>	136	49,6 MeV/A	19	48	46	c01	css1+css2	0,18	0,02 10 <sup>12</sup>	<0,1	1,26		
<b>Xe</b>	136	49,6 MeV/A	19	48	46	c02	css1+css2	0,07	0,01 10 <sup>12</sup>	<0,1	0,49		
<b>Cs</b>	133	6 MeV/A	17	17	-	c01	css1	0,35	0,13 10 <sup>12</sup>	<0,1	0,00	test done in 2009	
<b>Cs</b>	133	49,3 MeV/A	19	47	45	c01	css1+css2	0,08	0,01 10 <sup>12</sup>	<0,1	0,13	test done in 2009	
<b>Sm</b>	154	32 MeV/A	20	46	44	?	css1+css2	0,1	0,01 10 <sup>12</sup>	<0,1		done in 1993; to be tested again	
<b>Gd</b>	155	36,1 MeV/A	19	47	45	c02	css1+css2	0,1	0,01 10 <sup>12</sup>	<0,1	0,03		
<b>Gd</b>	157	35,1 MeV/A	19	47	45	c02	css1+css2	0,1	0,01 10 <sup>12</sup>	<0,1	0,04		
<b>Gd</b>	158	34,7 MeV/A	19	47	45	?	css1+css2	0,1	0,01 10 <sup>12</sup>	<0,1			
<b>Ta</b>	181	36 MeV/A	24	55	52	?	css1+css2	0,08	0,01 10 <sup>12</sup>	<0,1	0,05		
<b>Ta</b>	181	40 MeV/A	24	57	54	?	css1+css2	0,08	0,01 10 <sup>12</sup>	<0,1	0,31		
<b>Pb</b>	208	5 MeV/A	25	25	-	c01	css1	0,4	0,10 10 <sup>12</sup>	<0,1	0,00		
<b>Pb</b>	208	6,21 MeV/A	28	28	-	c01	css1	0,2	0,04 10 <sup>12</sup>	<0,1	0,00		
<b>Pb</b>	208	29 MeV/A	23	56	53	c01	css1	0,1	0,01 10 <sup>12</sup>	<0,1	0,19		
<b>U</b>	238	5,5 MeV/A	28	28	-	c01	css1	0,09	0,02 10 <sup>12</sup>	<0,1	0,00		
<b>U</b>	238	6,08 MeV/A	31	31	-	c01	css1	0,03	0,01 10 <sup>12</sup>	<0,1	0,00		
<b>U</b>	238	6,6 MeV/A	31	31	-	c01	css1	0,03	0,01 10 <sup>12</sup>	<0,1	0,00		
<b>U</b>	238	24 MeV/A	24	58	55	c01	css1+css2	0,05	0,01 10 <sup>12</sup>	<0,1	0,05		
<b>U</b>	238	24 MeV/A	24	58	55	c01	css1+css2	0,05	0,01 10 <sup>12</sup>	<0,1	0,05		
<b>U</b>	238	3,78 MeV/A	24	24	-	c01	css1	0,2	0,05 10 <sup>12</sup>	<0,1			
<b>U</b>	238	4,3 MeV/A	25	25	-	c01	css1	0,2	0,05 10 <sup>12</sup>	<0,1			
<b>U</b>	238	4,6 MeV/A	26	26	-	c01	css1	0,2	0,05 10 <sup>12</sup>	<0,1			
<b>U</b>	238	5 MeV/A	27	27	-	c01	css1	0,2	0,05 10 <sup>12</sup>	<0,1			
<b>U</b>	238	5,34 MeV/A	28	28	-	c01	css1	0,18	0,04 10 <sup>12</sup>	<0,1			
<b>U</b>	238	5,73 MeV/A	29	29	-	c01	css1	0,16	0,03 10 <sup>12</sup>	<0,1			
<b>U</b>	238	6,14 MeV/A	31	31	-	c01	css1	0,14	0,03 10 <sup>12</sup>	<0,1		30+ polluted	
<b>U</b>	238	6,6 MeV/A	31	31	-	c01	css1	0,14	0,03 10 <sup>12</sup>	<0,1			
<b>U</b>	238	7 MeV/A	32	32	-	c01	css1	0,1	0,02 10 <sup>12</sup>	<0,1			
<b>U</b>	238	7,44 MeV/A	33	33	-	c01	css1	0,08	0,02 10 <sup>12</sup>	<0,1		polluted cu65 (20%)	
<b>U</b>	238	7,8 MeV/A	34	34	-	c01	css1	0,04	0,01 10 <sup>12</sup>	<0,1		polluted N (3000%)	



: Beams done and accelerated



: Tested at the ion source and extrapolated, still not done for an experiment