

v.16.14.14  
04/24/23

Based on the “Load A1900 experimental settings” utility  
[https://lise.nslc.msu.edu/10\\_1/10\\_1\\_126\\_A1900\\_settings.pdf](https://lise.nslc.msu.edu/10_1/10_1_126_A1900_settings.pdf)

Utilities	1D-Plot	2D-Plot	Databases	Help
CODES: Charge, Global, PACE4, etc.				▶
Radioactivity, decay				▶
Reactions utilities				▶
Plots : Energy loss, Ranges, Stragglng, etc.				▶
FRIB / NSCL / ISOL rates				▶
NSCL / Europe / RIKEN primary beam lists				▶
Set-up utilities				▶
Range optimizer (Gas cell utility)				
Stripper foil lifetimes				

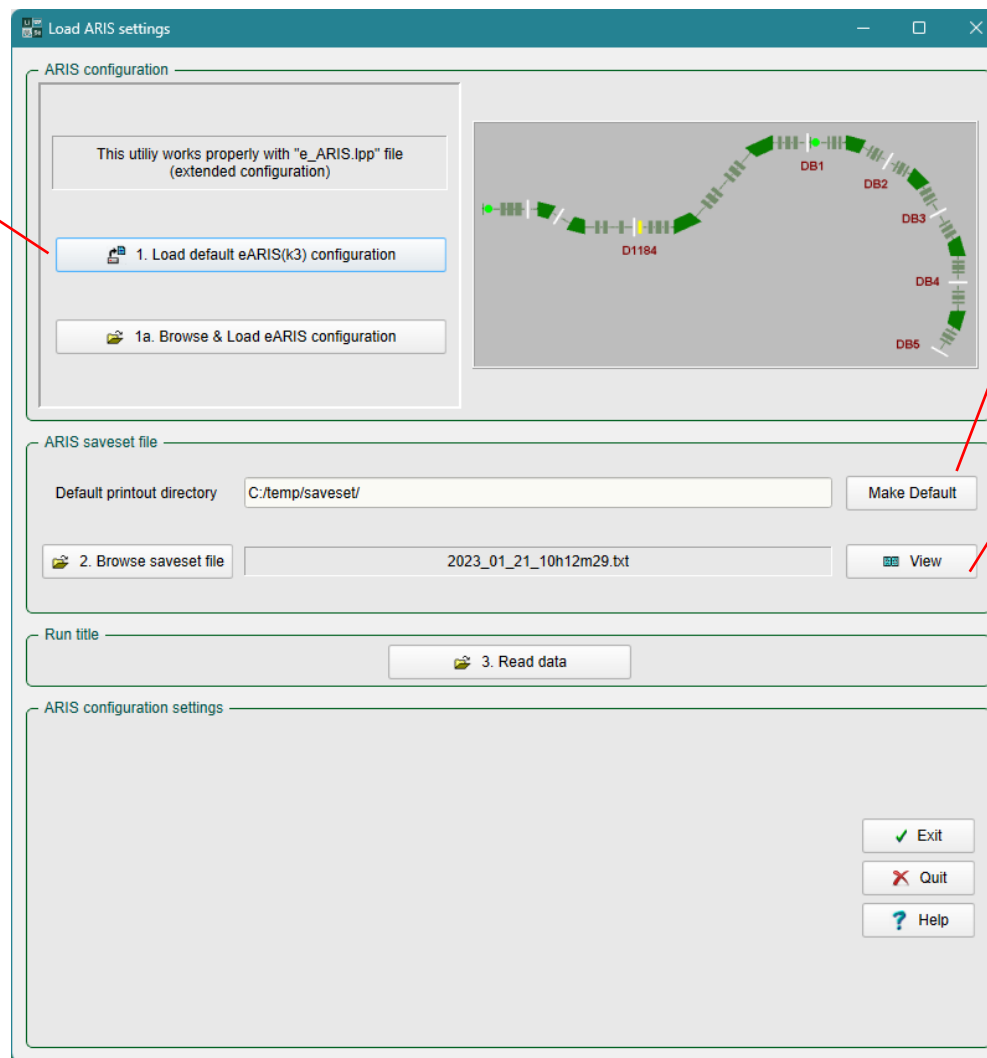
  

Load ARIS experimental settings
ARIS Beam Dump (under construction)
Load A1900 experimental settings
Calculation of Angle on the LISE3 target
Catcher utility (ISOL, Fusion-Residues)
MSP-144 utility
Twinsol (solenoid) utility
Gas pressure optimization for gas-filled dipole
FRIB mass table converter to LISE++ lme file

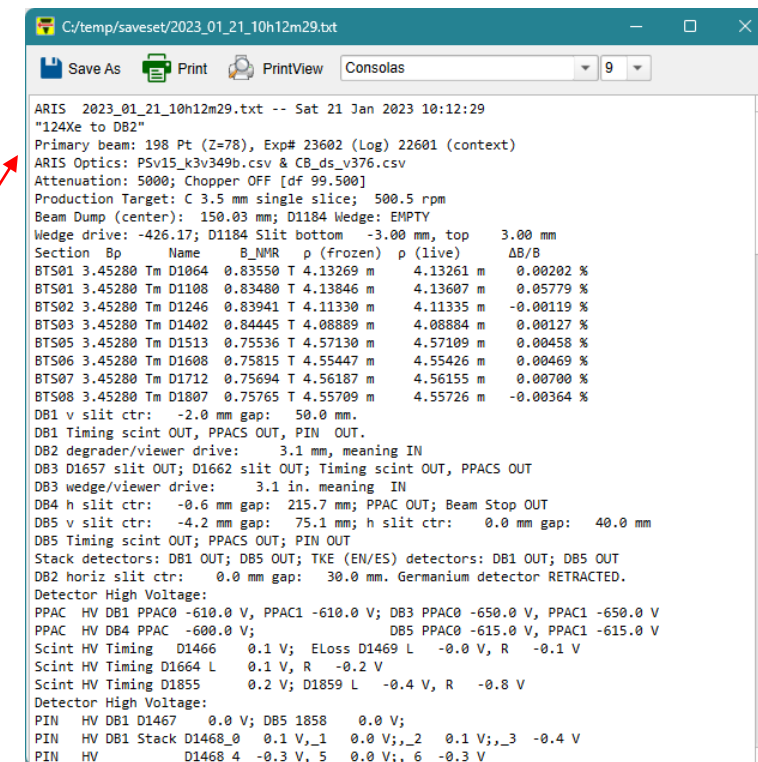
The utility has been designed to work with Extended ARIS configuration files, where Quads map calculated by LISE → eL\_\*\*\*.lpp

files/examples/FRIB/eARIS/eL\_ARIS.lpp

- It's recommended to prepare a file in advance, to have valid target, beam, wedges, materials
- Pay attention for k3 and k1 configuration choice: key parameter is the Matrix Element (0.33 or 1) of wedge block Wedge001 <=> FS\_F1S1:WED\_D1184



Make current directory be default



**ARIS configuration**

This utility works properly with "e\_ARIS.lpp" file (extended configuration)

1. Load default eARIS(k3) configuration

1a. Browse & Load eARIS configuration

**ARIS saveset file**

Default printout directory: C:/temp/saveset/ [Make Default]

2. Browse saveset file: 2023\_02\_03\_18h13m58\_run061.txt [View]

**Run title**

3. Read data

Title: ARIS 2023\_02\_03\_18h13m58.txt -- Fri 03 Feb 2023 18:13:58  
 "e22501 run 61: same as run 60, but DB5 slits closed"  
 Primary beam: 198 Pt (Z=78), Exp# 22501 (Log) 23602 (context)  
 ARIS Optics: PSv15\_k1\_v338.csv & CB\_hr\_v3112.csv

**ARIS configuration settings**

4. Load values in the code & Calculate matrices

	Values	use		Values	use
Projectile =	198Pt	<input checked="" type="checkbox"/>	Dipole fields =	N = 8 (8)	<input checked="" type="checkbox"/>
Production Target =	C 3.50 mm	<input checked="" type="checkbox"/>	Quadrupole fields =	N = 42 (42)	<input checked="" type="checkbox"/>
Wedge (D1184) =	Al : 0.050 mm	<input checked="" type="checkbox"/>	Sextupole fields =	N = 33 (42)	<input checked="" type="checkbox"/>
D1184 slit =	-28.0 : +40.0	<input checked="" type="checkbox"/>	DB1 detectors =		<input type="checkbox"/>
DB1 vert slit =	-10.0 : +6.0	<input checked="" type="checkbox"/>	DB3 detectors =	pp	<input type="checkbox"/>
DB2 horiz slit =	-101.0 : +92.6	<input checked="" type="checkbox"/>	DB4 detectors =	pp	<input type="checkbox"/>
DB4 horiz slit =	-108.4 : +107.3	<input checked="" type="checkbox"/>	DB5 detectors =	pp dE Esi	<input type="checkbox"/>
DB5 horiz slit =	-20.0 : +20.0	<input checked="" type="checkbox"/>	Use Quadrupole fudging factors		<input type="checkbox"/>
DB5 vert slit =	-20.0 : +20.0	<input checked="" type="checkbox"/>	Manual additional quadrupole field factor (default 0.9702)		<input type="checkbox"/>

Save current quad fields to scratch

Exit, Quit, Map plot, Help

Pay attention for:

- Primary beam validity
- No beam energy in saveset
- Target and Wedge thicknesses are nominal, not effective!



# Step 3 : Read saveset data to the dialog [2]

**Load ARIS settings**

ARIS configuration

This utility works properly with "e\_ARIS.lpp" file (extended configuration)

1. Load default eARIS(k3) configuration

1a. Browse & Load eARIS configuration

ARIS saveset file

Default printout directory: C:/temp/saveset/

2. Browse saveset file: 2023\_02\_03\_18h13m58\_run061.txt

Run title

3. Read data

Title: ARIS\_2023\_02\_03\_18h13m58.txt -- Fri 03 Feb 2023 18:13:58  
 "e22501 run 61: same as run 60, but DB5 slits closed"  
 Primary beam: 198 Pt (Z=78), Exp# 22501 (Log) 23602 (context)  
 ARIS Optics: PSv15\_k1\_v338.csv & CB\_hr\_v3112.csv

ARIS configuration settings

4. Load values in the code & Calculate matrices

Values	use	Values	use
Projectile = 198Pt	<input checked="" type="checkbox"/>	Dipole fields = N = 8 (8)	<input checked="" type="checkbox"/>
Production Target = C 3.50 mm	<input checked="" type="checkbox"/>	Quadrupole fields = N = 42 (42)	<input checked="" type="checkbox"/>
Wedge (D1184) = AI : 0.050 mm	<input checked="" type="checkbox"/>	Sextupole fields = N = 33 (42)	<input checked="" type="checkbox"/>
D1184 slit = -28.0 : +40.0	<input checked="" type="checkbox"/>	DB1 detectors =	<input type="checkbox"/>
DB1 vert slit = -10.0 : +6.0	<input checked="" type="checkbox"/>	DB3 detectors = pp	<input type="checkbox"/>
DB2 horiz slit = -101.0 : +92.6	<input checked="" type="checkbox"/>	DB4 detectors = pp	<input type="checkbox"/>
DB4 horiz slit = -108.4 : +107.3	<input checked="" type="checkbox"/>	DB5 detectors = pp dE Es	<input type="checkbox"/>
DB5 horiz slit = -20.0 : +20.0	<input checked="" type="checkbox"/>	Use Quadrupole fudging factors	<input type="checkbox"/>
DB5 vert slit = -20.0 : +20.0	<input checked="" type="checkbox"/>	Manual additional quadrupole field factor (default 0.9702)	<input type="checkbox"/>

Save current quad fields to scratch

Exit, Quit, Map plot, Help

mask to find a requested line

Contains "Tm D1064"

Starts from "Q\_D1013"

Starts from "S\_D1024"

C:/temp/saveset/2023\_01\_21\_10h12m29.txt

Save As, Print, PrintView, Consoles

```

Attenuation: 5000; Chopper OFF [df 99.500]
Production Target: C 3.5 mm single slice; 500.5 rpm
Beam Dump (center): 150.03 mm; D1184 Wedge: EMPTY
Wedge drive: -426.17; D1184 Slit bottom -3.00 mm, top 3.00 mm
Section Bp Name B_NMR p (frozen) p (live) ΔB/B
BTS01 3.45280 Tm D1064 0.83550 T 4.13269 m 4.13261 m 0.00202 %
BTS01 3.45280 Tm D1108 0.83480 T 4.13846 m 4.13607 m 0.05779 %
BTS02 3.45280 Tm D1246 0.83941 T 4.11330 m 4.11335 m -0.00119 %
BTS03 3.45280 Tm D1402 0.84445 T 4.08889 m 4.08884 m 0.00127 %
BTS05 3.45280 Tm D1513 0.75536 T 4.57130 m 4.57109 m 0.00458 %
BTS06 3.45280 Tm D1608 0.75815 T 4.55447 m 4.55426 m 0.00469 %
BTS07 3.45280 Tm D1712 0.75694 T 4.56187 m 4.56155 m 0.00700 %
BTS08 3.45280 Tm D1807 0.75765 T 4.55709 m 4.55726 m -0.00364 %
DB1 v slit ctr: -2.0 mm gap: 50.0 mm.
DB1 Timing scint OUT; PPACS OUT; PIN OUT.
DB2 degrader/viewer drive: 3.1 mm, meaning IN
DB3 D1657 slit OUT; D1662 slit OUT; Timing scint OUT, PPACS OUT
DB3 wedge/viewer drive: 3.1 in. meaning IN
DB4 h slit ctr: -0.6 mm gap: 215.7 mm; PPAC OUT; Beam Stop OUT
DB5 v slit ctr: -4.2 mm gap: 75.1 mm; h slit ctr: 0.0 mm gap: 40.0 mm
DB5 Timing scint OUT; PPACS OUT; PIN OUT
Stack detectors: DB1 OUT; DB5 OUT; TKE (EN/ES) detectors: DB1 OUT; DB5 OUT
DB2 horiz slit ctr: 0.0 mm gap: 30.0 mm. Germanium detector RETRACTED.
Detector High Voltage:
PPAC HV DB1 PPAC0 -610.0 V, PPAC1 -610.0 V; DB3 PPAC0 -650.0 V, PPAC1 -650.0 V
PPAC HV DB4 PPAC -600.0 V; DB5 PPAC0 -615.0 V, PPAC1 -615.0 V
Scint HV Timing D1466 0.1 V; ELoss D1469 L -0.0 V, R -0.1 V
Scint HV Timing D1664 L 0.1 V, R -0.2 V
Scint HV Timing D1855 0.2 V; D1859 L -0.4 V, R -0.8 V
Detector High Voltage:
PIN HV DB1 D1467 0.0 V; DB5 1858 0.0 V;
PIN HV DB1 Stack D1468_0 0.1 V;_1 0.0 V;_2 0.1 V;_3 -0.4 V
PIN HV D1468_4 -0.3 V;_5 0.0 V;_6 -0.3 V
PIN HV DB5 Stack D1858_0 -79.9 V;_1 -79.9 V;_2 -119.9 V;_3 -100.0 V
PIN HV D1858_4 -100.0 V;_5 -130.0 V;_6 0.0 V
    
```

Name	B(Optics)	B(live)	Ratio	(live)	Set[A]	Read[A]	
Q_D1013	4.035	4.035	1.000000	1.000004	269.0460	268.9770	Q_D1013
Q_D1024	-5.309	-5.309	1.000000	1.000000	-137.1595	-137.1658	Q_D1024
Q_D1035	3.517	3.517	1.000000	1.000000	90.8092	90.8073	Q_D1035
DV_D1064	0.863	0.836	0.968514	0.968514	101.1681	101.1715	DV_D1064
DV_D1108	-0.863	-0.835	0.967002	0.967002	-100.9245	-100.9357	DV_D1108
Q_D1137	3.261	3.261	1.000000	1.000000	109.7783	109.7747	Q_D1137
Q_D1148	-3.824	-3.824	1.000000	1.000000	-128.6604	-128.6767	Q_D1148
Q_D1170	2.141	2.141	1.000000	1.000000	72.4748	72.5293	Q_D1170
S_D1024	-1.393	0.000	-0.000-00	-0.000-00	0.0000	0.0008	S_D1024
S_D1035	1.980	0.000	-0.000-00	-0.000-00	0.0000	0.0015	S_D1035
S_D1137	2.418	0.000	-0.000-00	-0.000-00	0.0000	-0.0043	S_D1137

NO DB3 slits!

33 sextupoles have been found, 44 requests have been sent

# Step 3 : Read saveset data to the dialog [3]

ARIS configuration

This utility works properly with "e\_ARIS.lpp" file (extended configuration)

1. Load default eARIS(k3) configuration

1a. Browse & Load eARIS configuration

ARIS saveset file

Default printout directory: C:/temp/saveset/

2. Browse saveset file: 2023\_02\_03\_18h13m58\_run061.txt

Run title

3. Read data

ARIS configuration settings

4. Load values in the code & Calculate matrices

Values	use	Values	use
Projectile = 198Pt	<input checked="" type="checkbox"/>	Dipole fields = N = 8 (8)	<input checked="" type="checkbox"/>
Production Target = C 3.50 mm	<input checked="" type="checkbox"/>	Quadrupole fields = N = 42 (42)	<input checked="" type="checkbox"/>
Wedge (D1184) = AI : 0.050 mm	<input checked="" type="checkbox"/>	Sextupole fields = N = 33 (42)	<input checked="" type="checkbox"/>
D1184 slit = -28.0 : +40.0	<input checked="" type="checkbox"/>	DB1 detectors =	<input type="checkbox"/>
DB1 vert slit = -10.0 : +6.0	<input checked="" type="checkbox"/>	DB3 detectors = pp	<input type="checkbox"/>
DB2 horiz slit = -101.0 : +92.6	<input checked="" type="checkbox"/>	DB4 detectors = pp	<input type="checkbox"/>
DB4 horiz slit = -108.4 : +107.3	<input checked="" type="checkbox"/>	DB5 detectors = pp dE Esi	<input type="checkbox"/>
DB5 horiz slit = -20.0 : +20.0	<input checked="" type="checkbox"/>	Use Quadrupole fudging factors	<input type="checkbox"/>
DB5 vert slit = -20.0 : +20.0	<input checked="" type="checkbox"/>	Manual additional quadrupole fudge factor (default 0.9702)	<input type="checkbox"/>

Save current quad fields to scratch

Exit, Quit, Map plot, Help

Not used

dE : pin  
 pp : PPACs  
 t : timing scintillator  
 Esi : Si telescope  
 Ecs : TKE scintillator

Currently they are not used in the code.  
 E-configuration with detectors should be developed

# Step 4 : Load values in the code & Calculate matrices

ARIS configuration settings

4. Load values in the code & Calculate matrices

Values	use	Values	use
Projectile = 198Pt	<input type="checkbox"/>	Dipole fields = N = 8 (8)	<input checked="" type="checkbox"/>
Production Target = C 3.50 mm	<input type="checkbox"/>	Quadrupole fields = N = 42 (42)	<input checked="" type="checkbox"/>
Wedge (D1184) = empty	<input type="checkbox"/>	Sextupole fields = N = 33 (42)	<input checked="" type="checkbox"/>
D1184 slit = -3.0 : +3.0	<input checked="" type="checkbox"/>	DB1 detectors =	<input type="checkbox"/>
DB1 vert slit = -27.0 : +23.0	<input checked="" type="checkbox"/>	DB3 detectors =	<input type="checkbox"/>
DB2 horiz slit = -15.0 : +15.0	<input checked="" type="checkbox"/>	DB4 detectors =	<input type="checkbox"/>
DB4 horiz slit = -108.4 : +107.3	<input checked="" type="checkbox"/>	DB5 detectors =	<input type="checkbox"/>
DB5 horiz slit = -20.0 : +20.0	<input checked="" type="checkbox"/>	Use Quadrupole fudging factors	<input type="checkbox"/>
DB5 vert slit = -41.8 : +33.3	<input checked="" type="checkbox"/>	Manual additional quadrupole field factor (default 0.9702)	<input type="checkbox"/>

Buttons: Exit, Quit, Map plot, Help

Do not forget to save current quad fields to scratch if you are planning to plot them later to compare with new fields

Save current quad fields to scratch

ARIS saveset reading log

```

C:/temp/saveset/2023_01_21_10h12m29.txt
slits slits_PS_WED: -3.0 : +3.0
slits PS_I_slits: -27.0 : +23.0
slits DB2_Slits: -15.0 : +15.0
slits DB4_Slits: -108.4 : +107.3
slits DB5_Slits: -20.0 : +20.0
slits DB5_Slits: -41.8 : +33.3
dipole 1: FSD1_SCD1 <> FS_F1S1:DV_D1064: 3.4528 Tm
dipole 2: FSD1_SCD2 <> FS_F1S1:DV_D1108: 3.4528 Tm
dipole 3: FSD2_SCD3 <> FS_F1S2:DV_D1246: 3.4528 Tm
dipole 4: FSD2_SCD4 <> FS_F1S2:DV_D1402: 3.4528 Tm
dipole 5: DH_D1513 <> FS_F2S1:DH_D1513: 3.4528 Tm
dipole 6: DH_D1608 <> FS_F2S2:DH_D1608: 3.4528 Tm
dipole 7: FSDA_3 <> FS_F3S1:DH_D1712: 3.4528 Tm
dipole 8: DH_D1807 <> FS_F3S2:DH_D1807: 3.4528 Tm
quad 1: WIQ1 <> FS_F1S1:Q_D1013: +4.196 kG
quad 2: WIQ2 <> FS_F1S1:Q_D1024: -6.902 kG
quad 3: WIQ3 <> FS_F1S1:Q_D1035: +4.572 kG
quad 4: WIQ4 <> FS_F1S1:Q_D1137: +6.522 kG
quad 5: WIQ5 <> FS_F1S1:Q_D1148: -7.648 kG
quad 6: WIQ7 <> FS_F1S1:Q_D1170: +4.282 kG
quad 7: CIQT1A <> FS_F1S2:Q_D1195: +9.239 kG
quad 8: CIQT1B <> FS_F1S2:Q_D1207: -9.596 kG
quad 9: CIQT1C <> FS_F1S2:Q_D1218: +6.644 kG
quad 10: CIQT2A <> FS_F1S2:Q_D1288: +1.433 kG
quad 11: CIQT2B <> FS_F1S2:Q_D1299: -4.585 kG
quad 12: CIQT2C <> FS_F1S2:Q_D1311: +3.498 kG
quad 13: CIQT3A <> FS_F1S2:Q_D1338: +1.625 kG
quad 14: CIQT3B <> FS_F1S2:Q_D1349: -3.533 kG
quad 15: CIQT3C <> FS_F1S2:Q_D1361: +2.466 kG
quad 16: CIQT4A <> FS_F1S2:Q_D1430: +2.661 kG
quad 17: CIQT4B <> FS_F1S2:Q_D1441: -5.472 kG
quad 18: CIQT4C <> FS_F1S2:Q_D1453: +2.832 kG
quad 19: Q_D1476 <> FS_F2S1:Q_D1476: +9.110 kG
quad 20: Q_D1484 <> FS_F2S1:Q_D1484: -11.181 kG
quad 21: Q_D1492 <> FS_F2S1:Q_D1492: +12.180 kG
quad 22: Q_D1538 <> FS_F2S1:Q_D1538: +7.083 kG
quad 23: Q_D1545 <> FS_F2S1:Q_D1545: -9.057 kG
quad 24: Q_D1553 <> FS_F2S1:Q_D1553: +9.312 kG
quad 25: Q_D1573 <> FS_F2S2:Q_D1573: +9.831 kG
quad 26: Q_D1580 <> FS_F2S2:Q_D1580: -8.988 kG
quad 27: Q_D1588 <> FS_F2S2:Q_D1588: +6.020 kG
quad 28: Q_D1629 <> FS_F2S2:Q_D1629: +4.656 kG
quad 29: Q_D1639 <> FS_F2S2:Q_D1639: -9.065 kG
quad 30: Q_D1646 <> FS_F2S2:Q_D1646: +11.499 kG
    
```

Save As

File name: eL\_ARIS.lpp

Save as type: LISE++ files (\*.lpp)

Buttons: Save, Cancel

After the Save As dialog box closes, the Log window appears with information about loaded values

Do not save to eL\_ARIS.lpp  
Rename it!

- First “dummy” dipole is set to Brho value of FSD1\_SCD1 from saveset, another “dummy” dipoles are not changed
- [Currently] the dipole Brho value is equal to **saveset’s Brho value**. It is planned to implement an option to download B\_NMR for Brho and matrix calculations

```
struct dipole_array
{
    QString name;
    double Brho;
    double B_NMR;
    double r_frozen;
    double r_live;
};
```

- [Currently] the quadrupole and sextupole values are calculated based on **B(live) gradient** from savesets

```
struct quad_array
{
    QString name;
    double B_optics;
    double B_live;
    double ratio;
    double ratio_live;
    double A_set;
    double A_read;
};
```

Attenuation: 5000; Chopper OFF [df 99.500]  
 Production Target: C 3.5 mm single slice; 500.5 rpm  
 Beam Dump (center): 150.03 mm; D1184 Wedge: EMPTY  
 Wedge drive: -426.17; D1184 Slit bottom -3.00 mm, top 3.00 mm

Section	Bp	Name	B_NMR	p (frozen)	p (live)	ΔB/B
BTS00	3.45280	Tm D1064	0.83550	T 4.13269	m 4.13261	m 0.00202 %
BTS01	3.45280	Tm D1108	0.83480	T 4.13846	m 4.13607	m 0.05779 %
BTS02	3.45280	Tm D1246	0.83941	T 4.11330	m 4.11335	m -0.00119 %
BTS03	3.45280	Tm D1402	0.84445	T 4.08889	m 4.08884	m 0.00127 %
BTS05	3.45280	Tm D1513	0.75536	T 4.57130	m 4.57109	m 0.00458 %
BTS06	3.45280	Tm D1608	0.75815	T 4.55447	m 4.55426	m 0.00469 %
BTS07	3.45280	Tm D1712	0.75694	T 4.56187	m 4.56155	m 0.00700 %
BTS08	3.45280	Tm D1807	0.75765	T 4.55709	m 4.55726	m -0.00364 %

Name	B(Optics)	B(live)	Ratio	(live)	Set[A]	Read[A]
Q_D1013	4.035	4.035	1.000000	1.000004	269.0460	268.9770
Q_D1024	-5.309	-5.309	1.000000	1.000000	-137.1595	-137.1658
Q_D1035	3.517	3.517	1.000000	1.000000	90.8092	90.8073