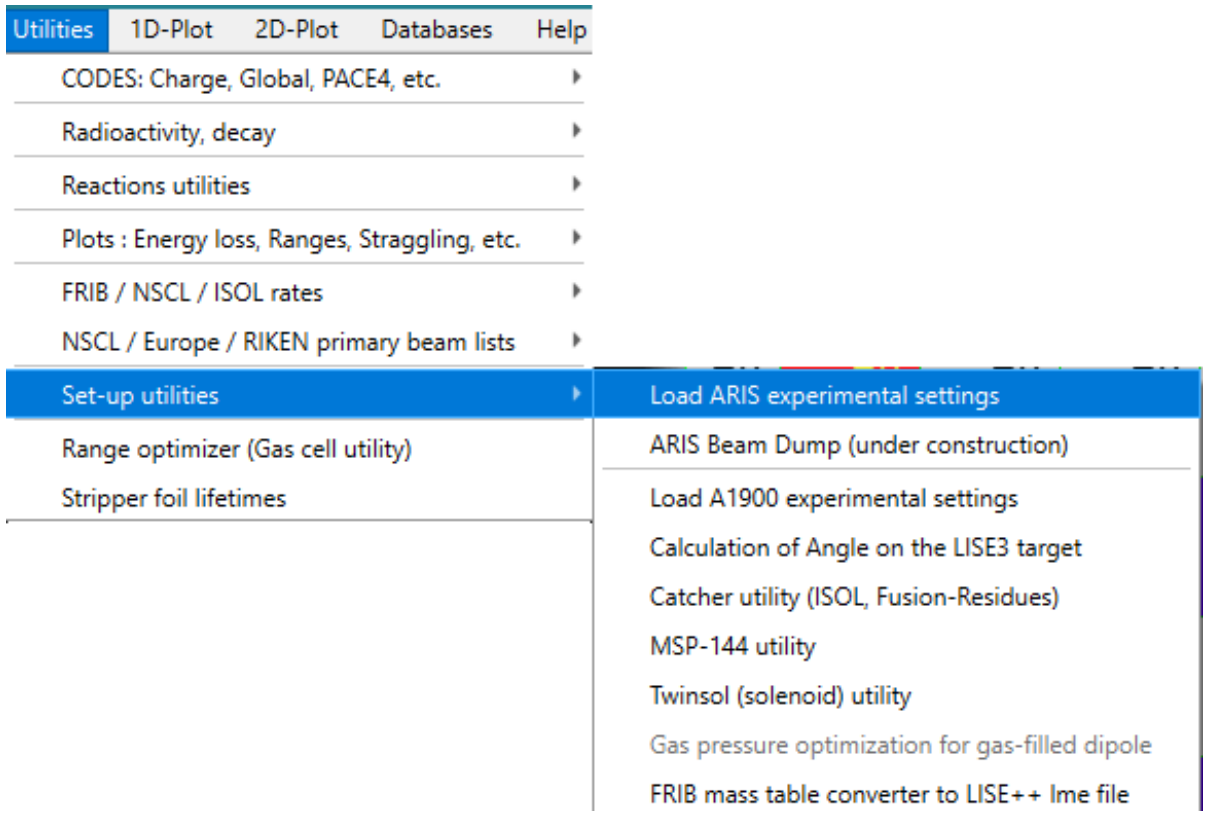
Load ARIS experimental settings

v.16.14.14
04/24/23

Based on the “Load A1900 experimental settings” utility
https://lise.nscl.msu.edu/10_1/10_1_126_A1900_settings.pdf

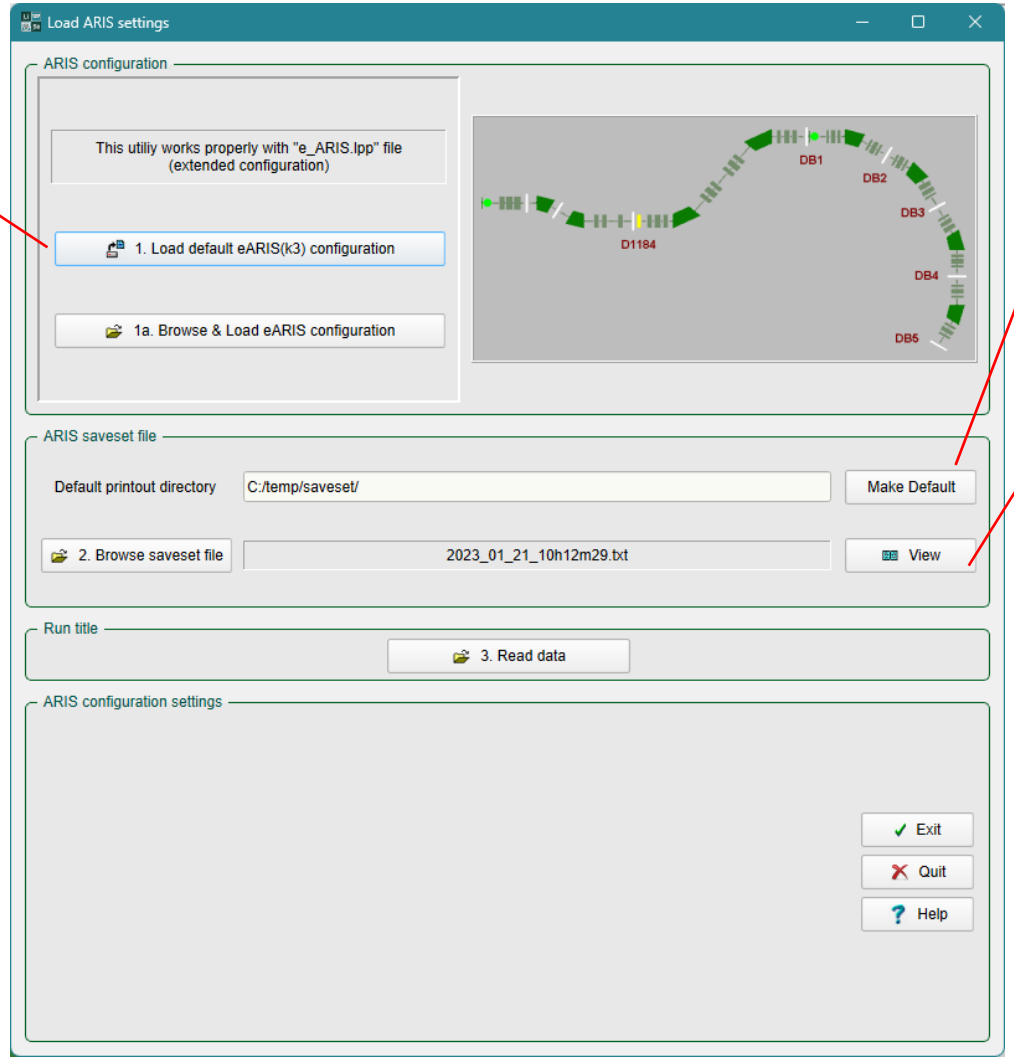


Steps 1 & 2 : LISE ARIS configuration and ARIS savesets

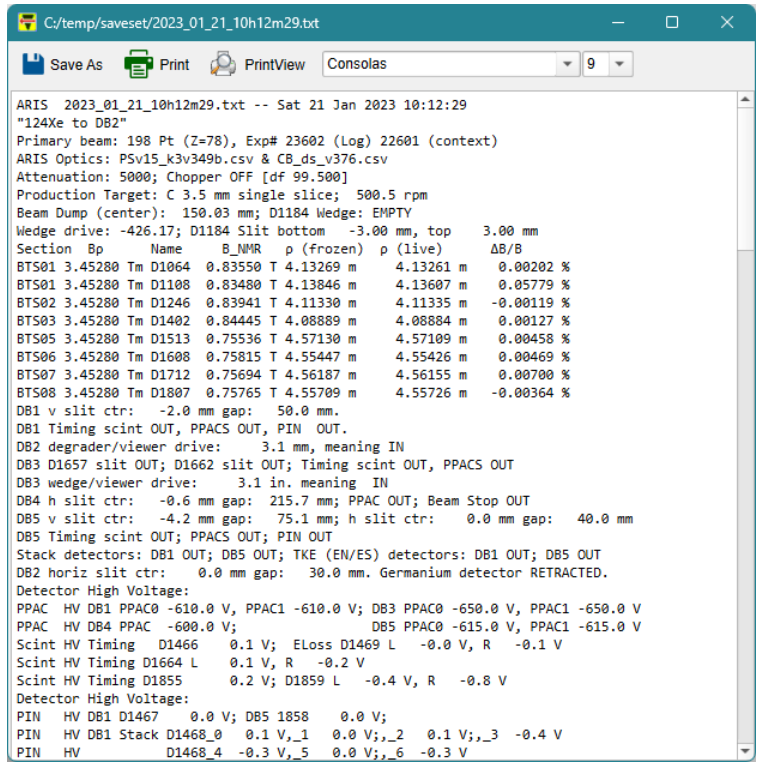
The utility has been designed to work with
Extended ARIS configuration files, where Quads map calculated by LISE → eL_***.lpp

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 choise: key parameter is the Matrix Element (0.33 or 1) of wedge block Wedge001 <> FS_F1S1:WED_D1184



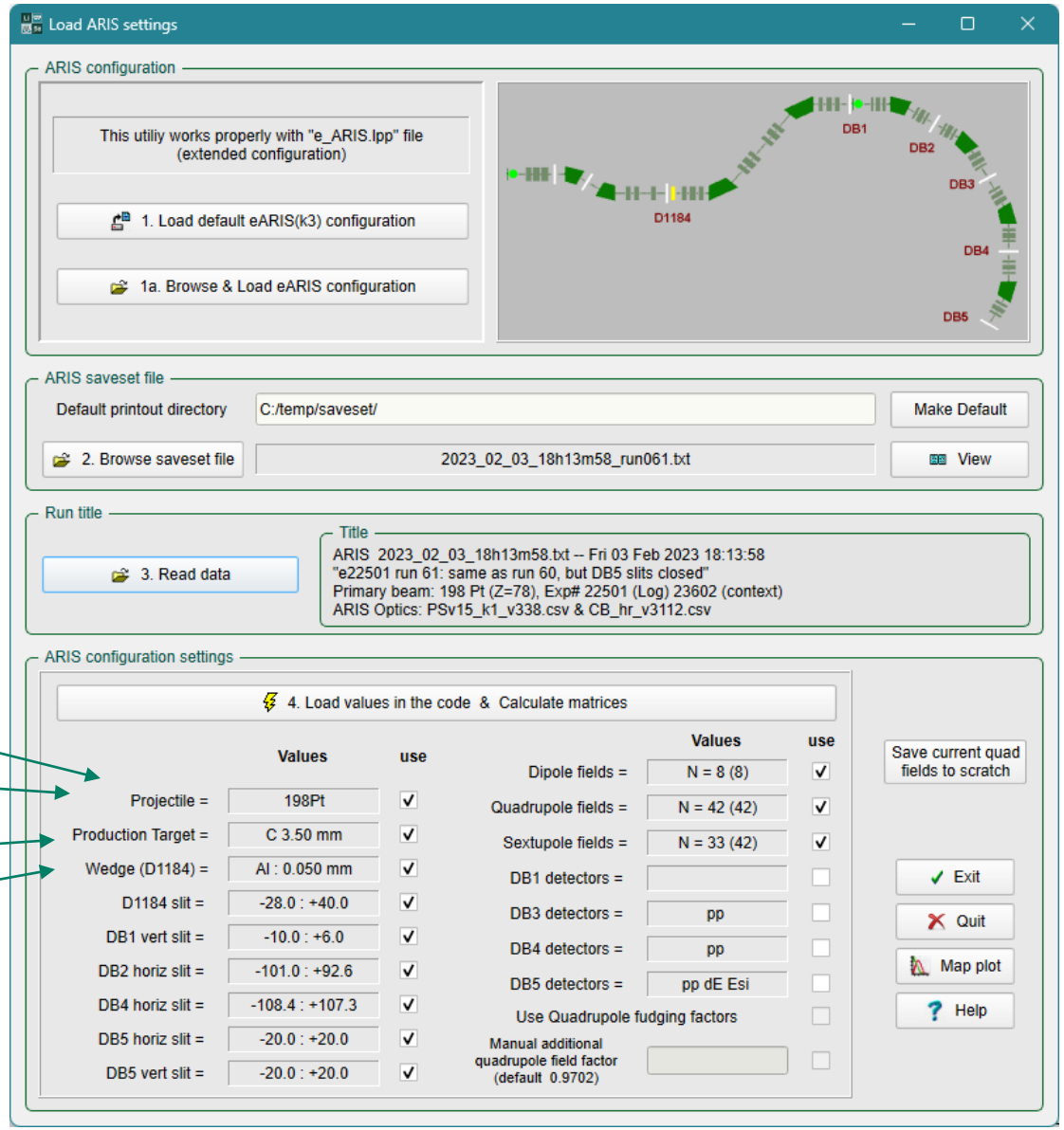
Make current directory be default



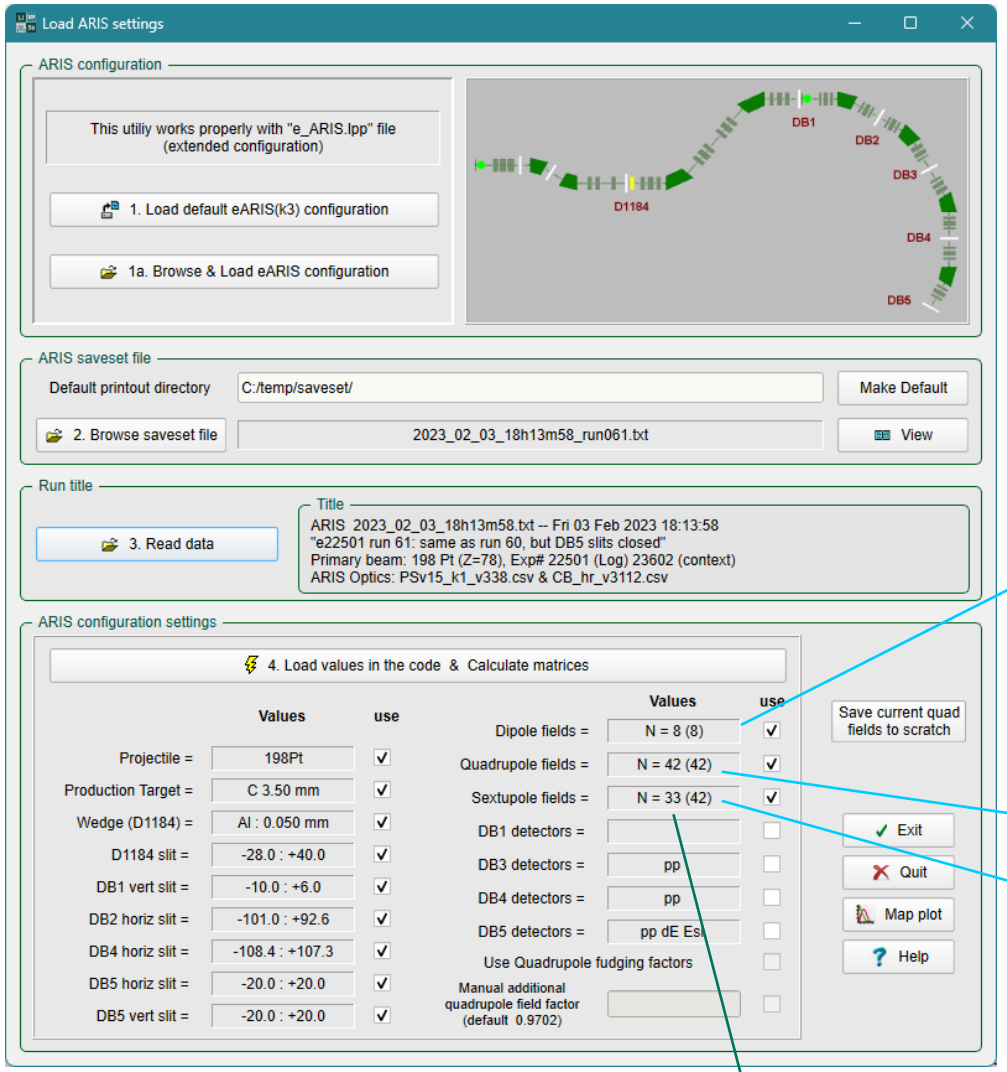
Step 3 : Read saveset data to the dialog [1]

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]



NO DB3 slits!

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

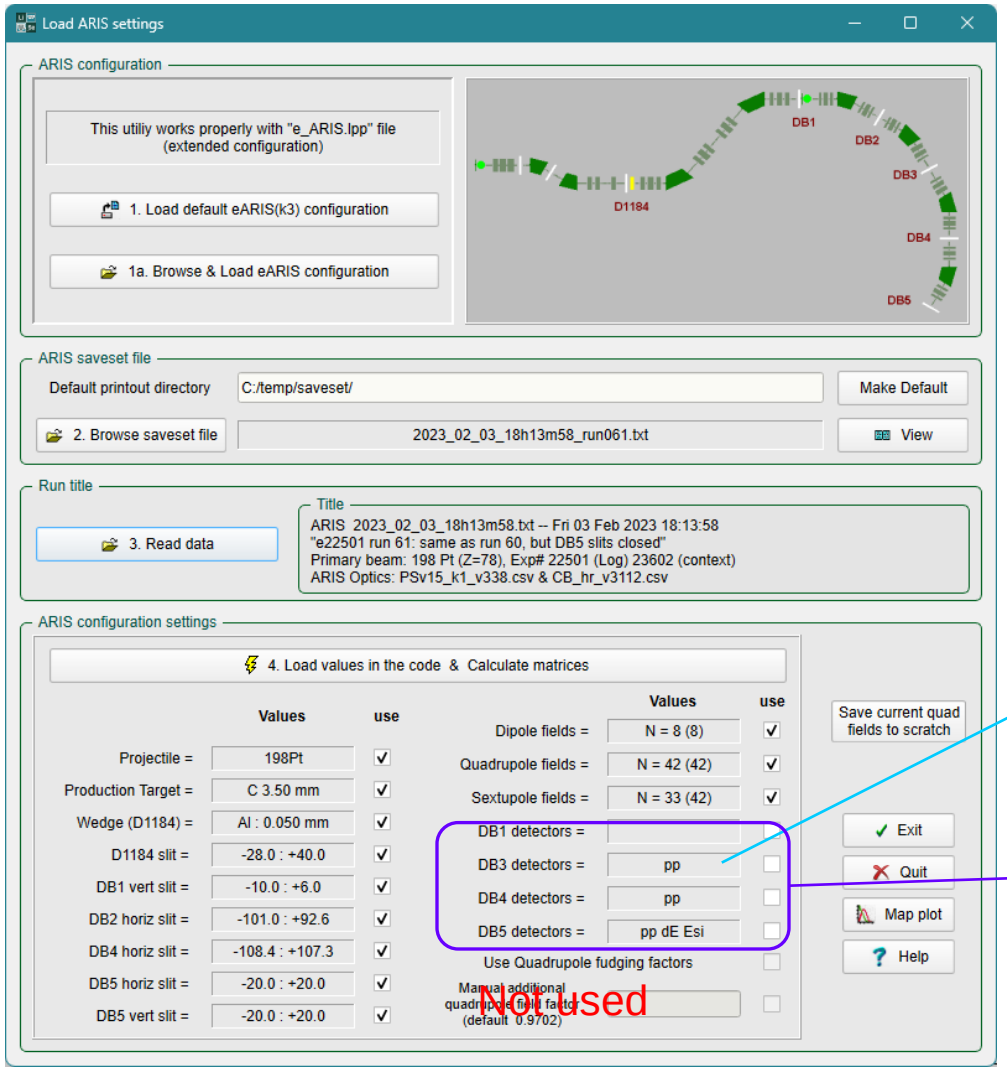
Save As | Print | PrintView | Consolas | 9

```
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   ρ (frozen)  ρ (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]
------------------------------ F1S1 ----------------------------------
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
```

33 sextupoles have been found, 44 requests have been sent

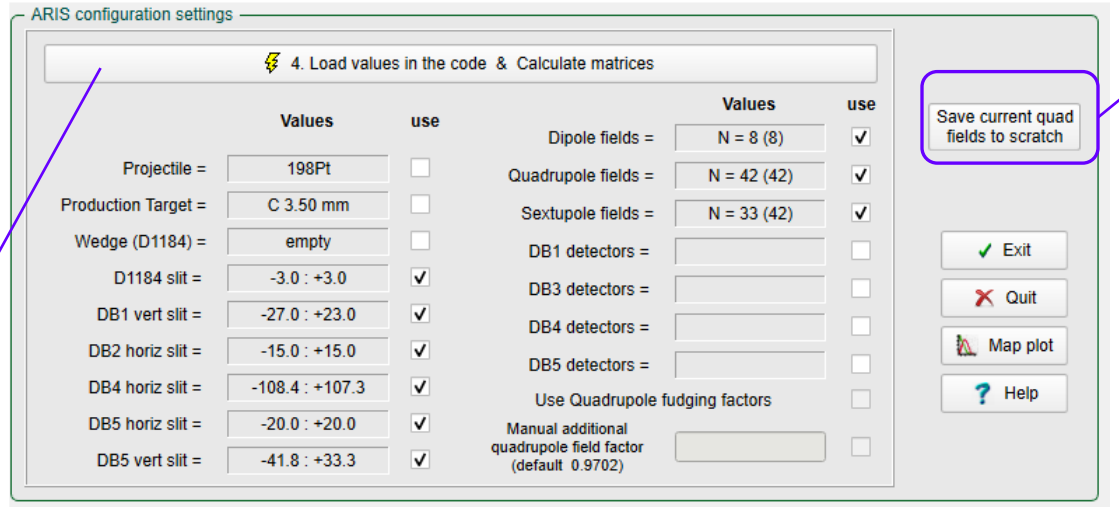
Step 3 : Read saveset data to the dialog [3]



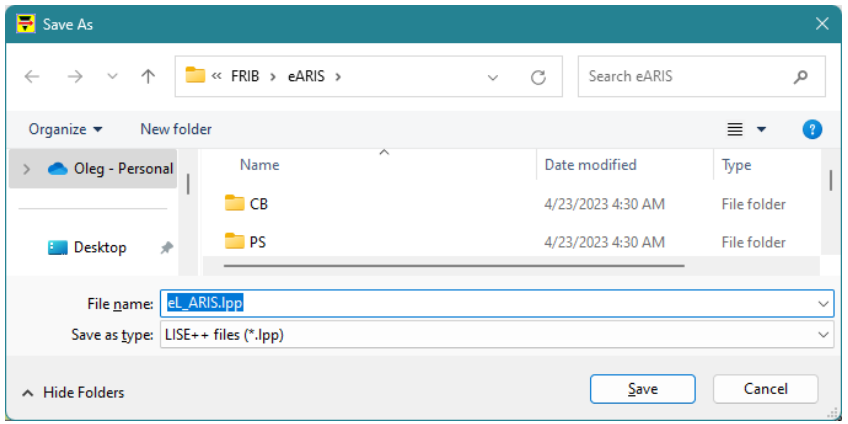
dE : pin
pp : PPACs
t : timing scintillator
Esi : Si telescope
Ecs : TKE scintillator

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

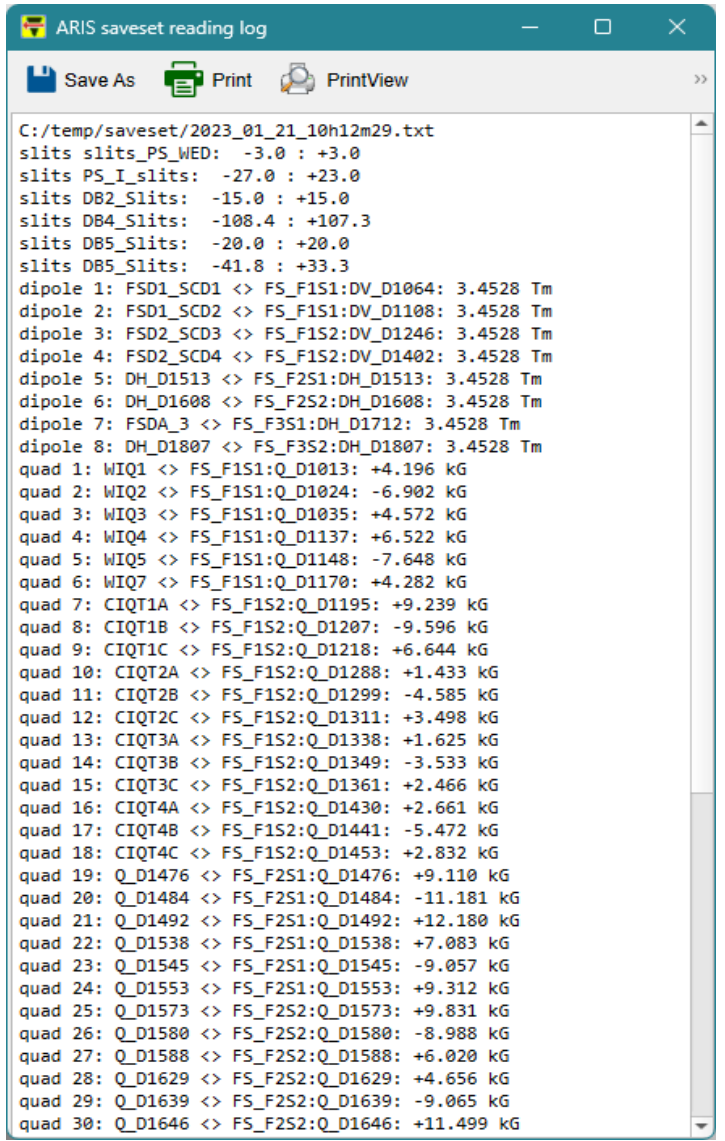
Step 4 : Load values in the code & Calculate matrices



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



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!

Important notes

- 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 savest’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;
  };
```

C:/temp/saveset/2023_01_21_10h12m29.txt

Save As | Print | PrintView | Consolas | 9

```
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Scint HV Timing D1664 L    0.1 V, R   -0.2 V
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PIN   HV DB1 Stack D1468_0   0.1 V,_1   0.0 V;,_2   0.1 V;,_3  -0.4 V
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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
```