Coming to ARIS SpecTcl v.28

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2 October 2024

Research presentation

This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics and used resources of the Facility for Rare Isotope Beams (FRIB) Operations, which is a DOE Office of Science User Facility under Award Number DE-SC0023633, and by the US National Science Foundation under Grants No. PHY-20-12040 and 23-10078 “Windows on the Universe: Open Quantum Systems in Atomic Nuclei at FRIB”.

Content

- Merging version 27 VME & PID
- 27.6 and 27.7 versions details
- Calibration files: new CSV-option
- Spectra definition
- SpecTk windows
- SpecTk development; SpecTk ←→ Xamine

Merging v.27 VME & PID versions

VME

08/12/2024 ek

added debugging for modules (aris.debug set =2 to turn on). Module id and channel numbers are kept in hex (+ whole word) to make it easier to map back to the datastream.

fixed zeroing of db3 south scintillator for efficiency calculations.
added new tcl function to parse some of the calibration data to read csv files. Initialize values to 0 or 1 if run number not tables. This is to minimize the need to modify calibration files with new info based on the next run number.

fixed broken tcl info data. Master points to correct triggers and seems still to be backwards compatible. The tof reference points to the parameters used to calculate the time of flight.

Added in Oleg's updated optics for length corrections.
Reinstated initialization of determination of run number being attached based on the file name to remove flakey initialization of value upon attachment for reading the calibration files.

Updating spectcl def files with new naming convention.
Adding functions in some definition files to deattach spectra from memory by still defined in tree gui
Updated to compile against 5.13-015 and increased display memory
added Oleg's mod for selection of tdc tof based on first or last hit within a tdc cut

PID

```
************************************************************
06/05/2024  v.27.0
new TKE methods 521,531,541 for two db5-pin and Sci
calibration brho.tcl has been compressed
************************************************************
07/15/2024  v.27.1
minor Elaine's modifications implemented
************************************************************
07/21/2024  v.27.2
Update of trajectory reconstruction: slit X & Y to increase efficiency
************************************************************
07/22/2024  v.27.3
ChannelAssign revision, firstHit – update
// -2 --> take last  in bounds,    -1 --> take first in bounds,
//  0 --> take last (>0)          ,      1 --> take Nth  (>0)
************************************************************
07/23/2024  v.27.4
pinFactor for TKE with Sci
************************************************************
07/25/2024  v.27.5
Mass "banana" rotation relatively Z
************************************************************
07/28/2024  v.27.6
introduction of weights for Z_method=1
************************************************************
08/05/2024  v.27.7
class ARISdiagnosticsBox :   update  for trajectory reconstruction
CTreeParameter xm,ym
CTreeVariable zm
```

PID SpecTcl v.27.6

introduction of weights for Z_method=1

To improve Z-resolution because of db5.pin was not depleted well (see file e24605_optics2.pdf)

\calibrations\brho.tcl

set aris.pid.wZ_pin 1.037258
set aris.pid.wZ_si0 4.; # sig 4 is best

```
if (aris.db[box].pin.dE.isValid())
{
    dE = (double) aris.db[box].pin.dE;
    if(aris.db[box].pin.e.isValid())
    {
        e_reduced = aris.db[box].pin.e * wZ_pin;
        weightTotal = wZ_pin;
    }
    TKE = dE;
}

//wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww   e_reduced si0,si1 begin
if (aris.db[box].stack.si[0].e>0 && Z_method >=1)
{
    e_reduced += aris.db[box].stack.si[0].e * wZ_si0;
    weightTotal += wZ_si0;
}
if (aris.db[box].stack.si[1].e>0 && Z_method >=2)
{
    e_reduced += aris.db[box].stack.si[1].e * wZ_si1;
    weightTotal += wZ_si1;
}

if(weightTotal>0) e_reduced /= weightTotal;
//wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww   e reduced si0,si1 end

  if (dE_v > 0 && e_reduced > 0)
  {

      double zv = e_reduced / pow(dE_v,Z_log_beta);

      Z = zv*Z_slope2 + sqrt(zv)*Z_slope + Z_offset;
      flag_Z=true;
      AoQ += (Z-AoQ_rotatePoint)*AoQ_rotateSlope;
  }
```

PID SpecTcl v.27.7

class ARISdiagnosticsBox : update for trajectory reconstruction

new:
CTreeParameter xm,ym
CTreeVariable zm

Initially db*.x, db*.y based on db*.z parameter were used in trajectory reconstruction and db-tracking plots.

It has been split in the new version:

db*.xm , db*.ym based on db*.zm parameter – are used in trajectory reconstruction,
Whereas
db*.x , db*.y based on db*.z parameter – are used for regular track plots

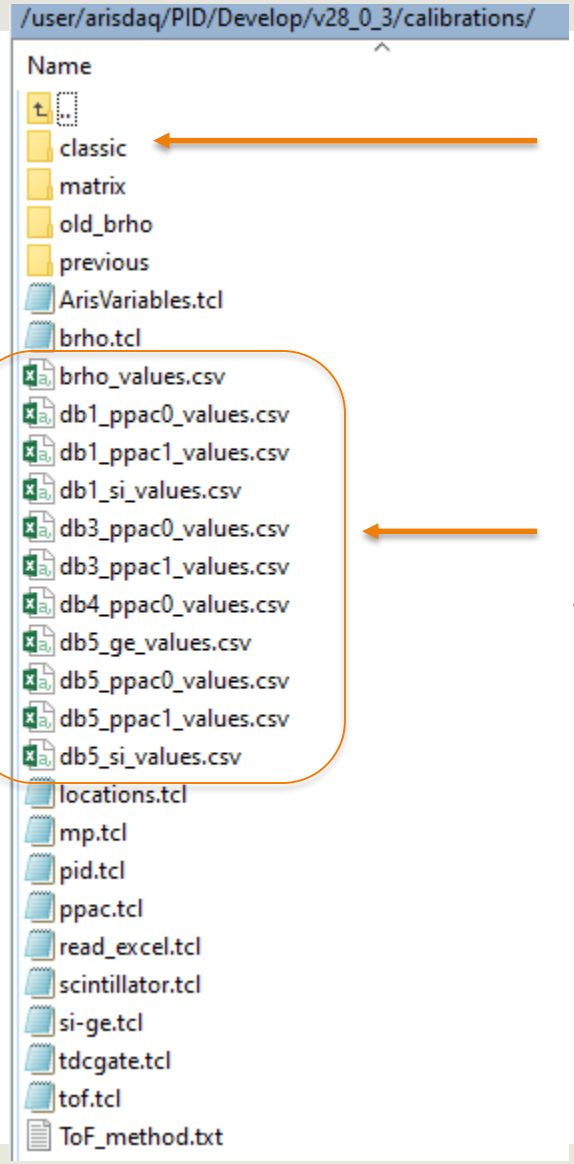
\calibrations\pid.tcl

```
} else {    ;# 2500-2540 e24605 82Se

        set aris.db1.zm ${aris.db1.z}
        set aris.db2.zm ${aris.db2.z}
        set aris.db3.zm ${aris.db3.ppac1.z}
        set aris.db4.zm ${aris.db4.ppac0.z}
        set aris.db5.zm ${aris.db5.ppac1.z}

        source ./calibrations/matrix/CB2_Dip34_run2515.tcl
        source ./calibrations/matrix/CB2_Dip45_run2515.tcl
}
```

\calibrations\locations.tcl

```
#------------ location of diagnostics box-----------------------------------

set aris.F1S1.z 18406.72 ;# mm from target to viewer/wedge
#set aris.F1S1.z 18306.32  ;# mm from target to slit
#set aris.F1S1.z 18156.72  ;# mm from target to collimator

set aris.db0.z 32425.222  ;# mm from target to viewer =center of box

set aris.db1.z 46586.078  ;# mm from target to viewer (center of box @ 46450
#set aris.db1.z 46485.9  ;# mm from target to db1_slits
#set aris.db1.z 46593.750  ;# mm from target to db1_slits

set aris.db2.z 56280.483  ;# mm from target to viewer=center of box

#set aris.db3.z 65708.1 ;# mm from target to 1st slit D1657
#set aris.db3.z 66025.647  ;# mm from target to wedge position (center of box
#set aris.db3.z 66151.6 ;# mm from target to 2nd slit D1662
set aris.db3.z 66025.6 ;# mm from target to viewer D1660

set aris.db4.z 75770.807  ;# mm from target to viewer (center of box@ 75755.8
set aris.db5.z 85580.061  ;# mm from target to viewer (center of box@ 85344.8
```

Calibration: CSV-option (Elaine)



Classic calibration files

CSV calibration files

\calibrations\ArisVariables.tcl

/user/arisdaq/PID/Develop/v28_0_3/calibrations/ArisVariables.tcl – arisdaq@fishtank – Editor – WinSCP

```
#
# A1RIS Calibration file
#                                                    ========================
set calibrationVersion 1; # 0-CSV, 1-classic

set aris.online 0 ;# 0 use absolute values
set aris.skipPingDataInfo 1;# 0= off
set aris.debug 0;#0/1/2 off/on/mesytec modules output
set aris.debugValue 0;# invalid channel being filling

global RunNumber ;# Get the run number from the calling function.
puts "RunNumber --> ${RunNumber}"

#-------------------------------------------------------

#rf shifted n number of 200 ns to fit inside 0-200 ns window
#set aris.tof.tdc.rf1.offset  3240.  ;#ns -relative to trigger

set aris.tof.tdc.rf1.offset  40.  ;#ns
set aris.tof.tdc.rf2.offset   0.  ;#ns -selectable channel on tdc2
set aris.tof.tdc.RF2channel  14 ;# channel number (stack3-7 not used)-see ArisPacket

#-------------------------------------------------------------------------------
if { $calibrationVersion == 0 } {    ;# CSV

        set varNames {aris.firstHit }

        source  read_csv.tcl
        source ./calibrations/locations.tcl
        source ./calibrations/ppac.tcl
        source ./calibrations/scintillator.tcl
        source ./calibrations/si-ge.tcl
        source ./calibrations/tdcgate.tcl
        source ./calibrations/tof.tcl
        source ./calibrations/pid.tcl
        source ./calibrations/brho.tcl
} else {                                ;# classic (old)

        source ./calibrations/locations.tcl            ;# as CSV
        source ./calibrations/classic/ppac.tcl
        source ./calibrations/scintillator.tcl         ;# as CSV
        source ./calibrations/classic/si-ge.tcl
        source ./calibrations/tdcgate.tcl               ;# as CSV
        source ./calibrations/classic/tof.tcl
        source ./calibrations/pid.tcl                   ;# as CSV
        source ./calibrations/classic/brho.tcl
}
```

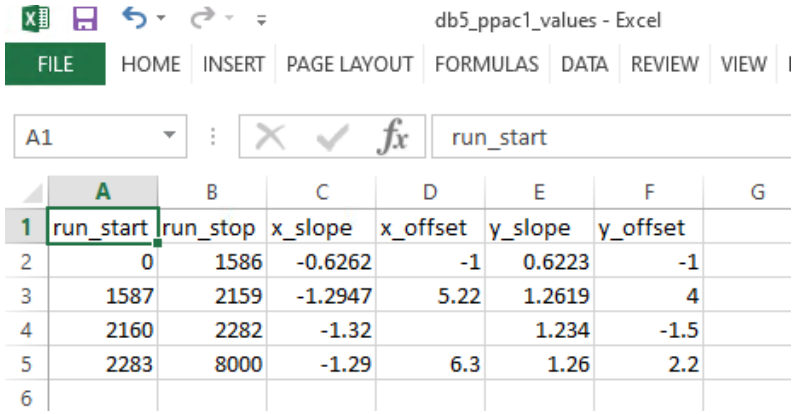
Calibration: CSV-option (Elaine) [2]

Conventions:

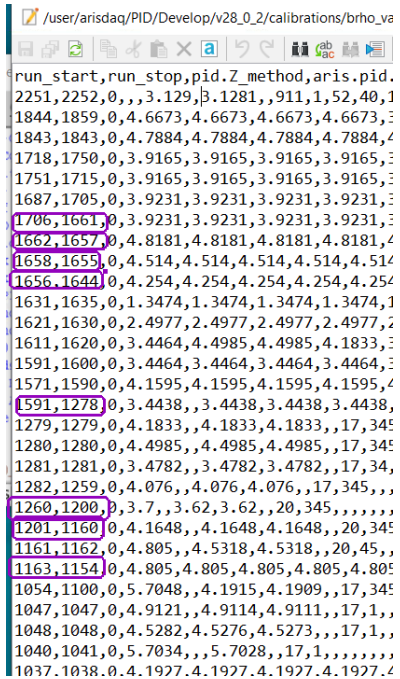
- Don't enter ALL information for old runs, but use this method starting this fall
- use CSV information for well-known "stable" parameters (e.g. avoid temporary PID parameters)

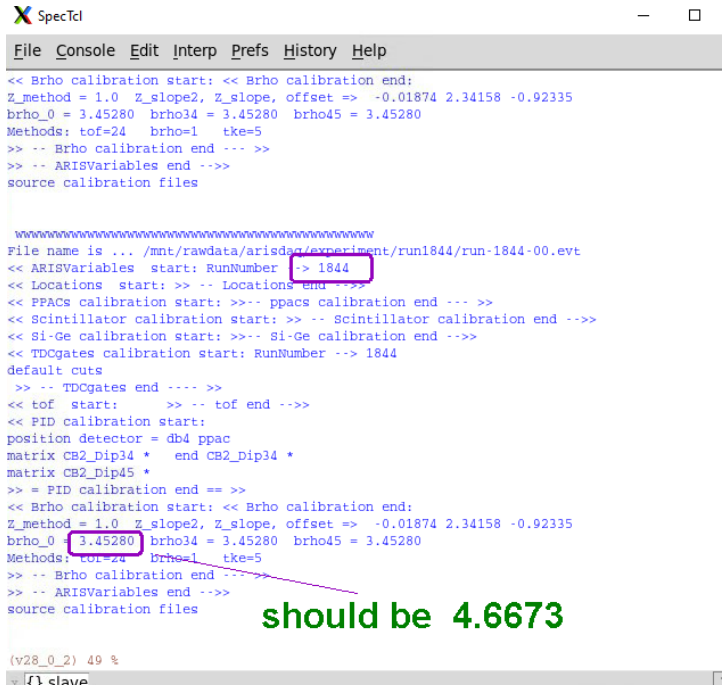
The new CSV option looks very promising, but still needs some work (debugging)

example

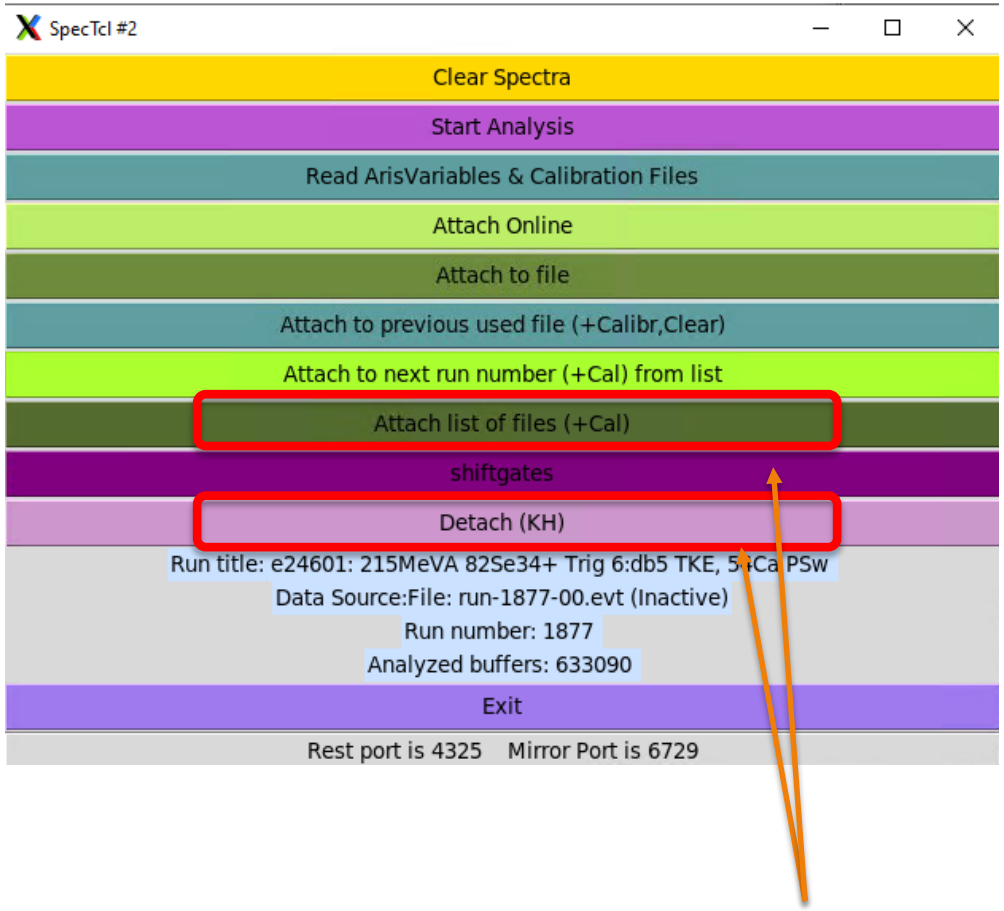


	A	B	C	D	E	F	G
1	run_start	run_stop	x_slope	x_offset	y_slope	y_offset	
2	0	1586	-0.6262	-1	0.6223	-1	
3	1587	2159	-1.2947	5.22	1.2619	4	
4	2160	2282	-1.32		1.234	-1.5	
5	2283	8000	-1.29	6.3	1.26	2.2	
6							

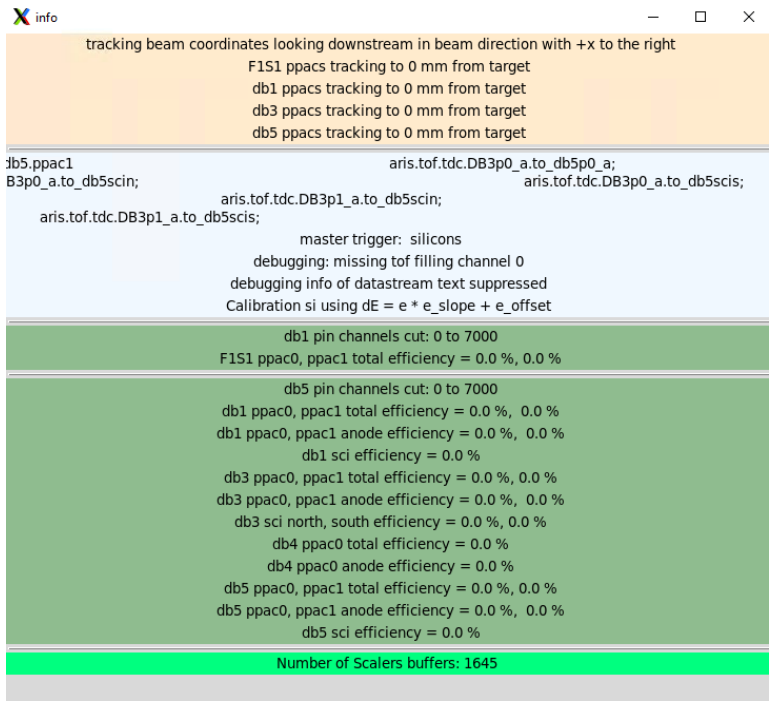




GUI.tcl and Info.tcl

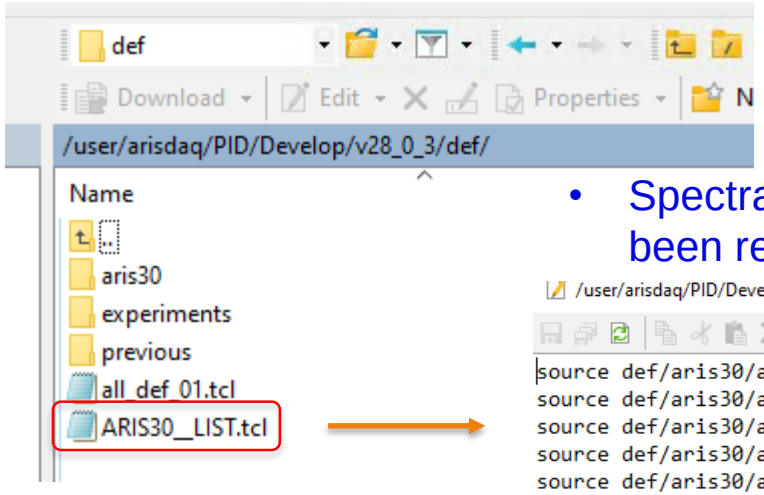


Info.tcl should be corrected for “average” time



Working with clusters by Kenny

Revision of Spectra Definition

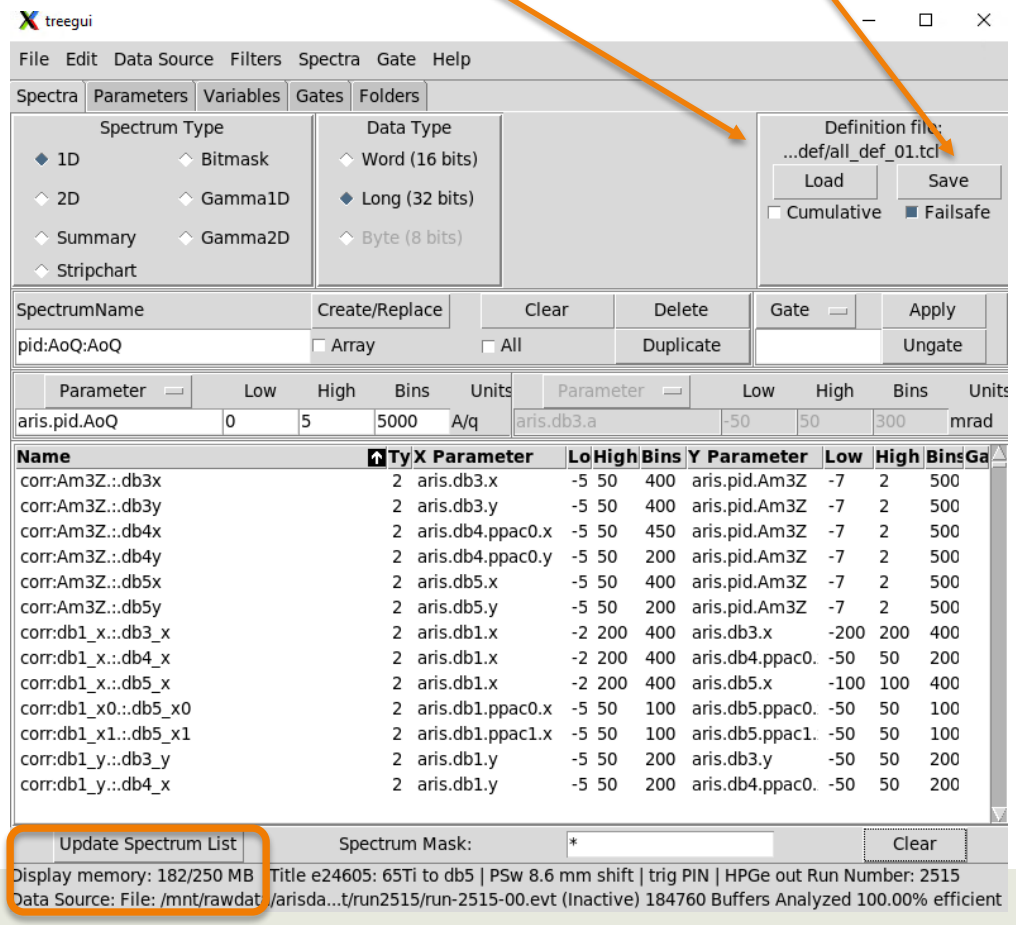


- Spectra definition have been revised in v.28

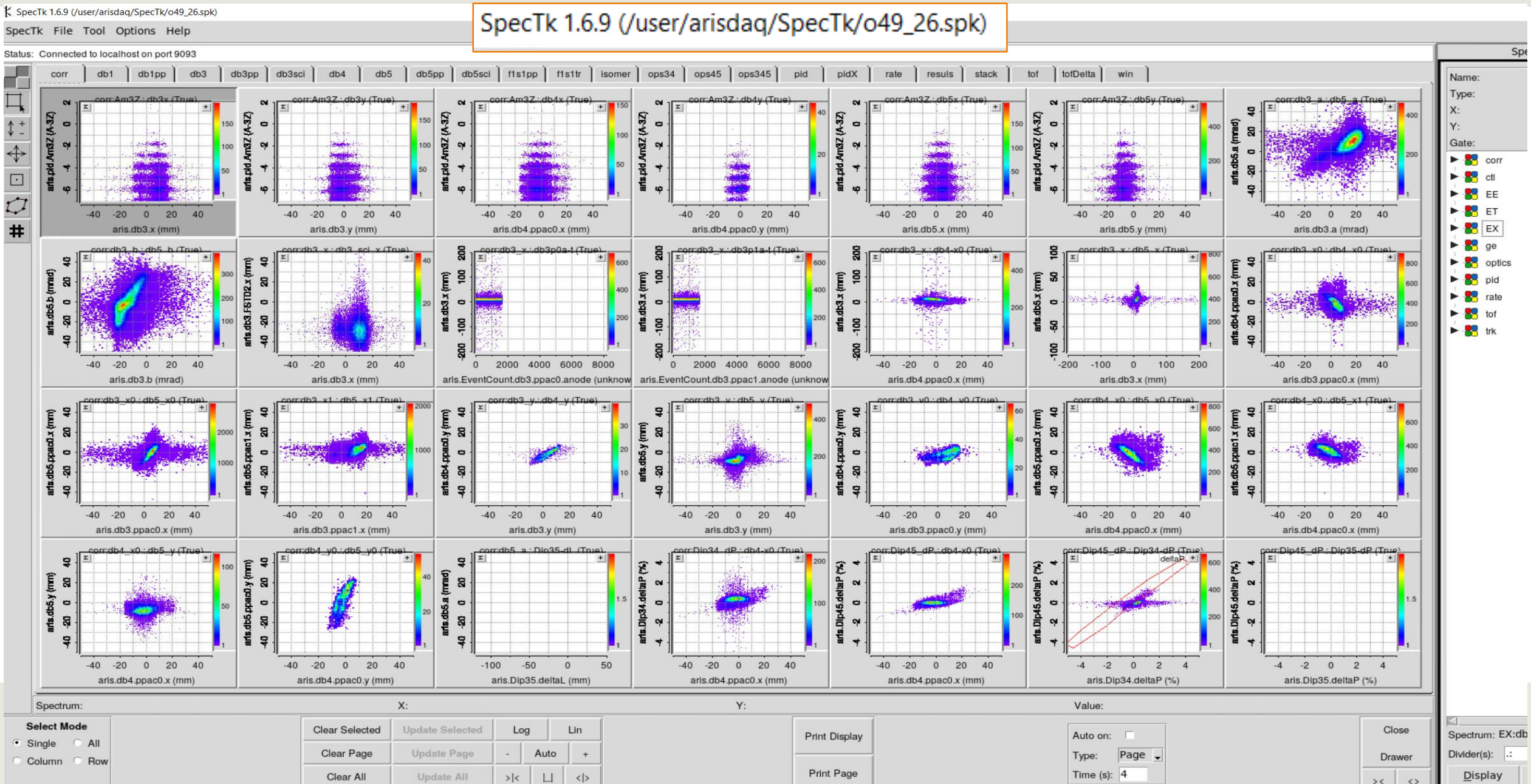
/user/arisdaq/PID/Develop/v28_0_3/def/ARIS30__LIST.tcl – arisdaq@f

```
source def/aris30/aris30_corr.tcl
source def/aris30/aris30_ctl_DB1.tcl
source def/aris30/aris30_ctl_DB1stack.tcl
source def/aris30/aris30_ctl_DB3.tcl
source def/aris30/aris30_ctl_DB4.tcl
source def/aris30/aris30_ctl_DB5.tcl
source def/aris30/aris30_ctl_DB5stack.tcl
source def/aris30/aris30_ctl_F1S1.tcl
source def/aris30/aris30_EE_db1.tcl
source def/aris30/aris30_EE_db5.tcl
source def/aris30/aris30_ET_db1.tcl
source def/aris30/aris30_ET_db5.tcl
source def/aris30/aris30_ET_db5_tac.tcl
source def/aris30/aris30_EX_db1.tcl
source def/aris30/aris30_EX_db5.tcl
source def/aris30/aris30_ge.tcl
#source def/aris30/aris30_optics135(CB1).tcl
source def/aris30/aris30_optics345(CB2).tcl
source def/aris30/aris30_pid.tcl
source def/aris30/aris30_rate.tcl
source def/aris30/aris30_tof_FS1_DB1.tcl
source def/aris30/aris30_tof_tac.tcl
source def/aris30/aris30_tof_tdc_trigRF.tcl
source def/aris30/aris30_tof_tdc345.tcl
source def/aris30/aris30_tof_tdc345_2D.tcl
source def/aris30/aris30_tof_tdc345_delta.tcl
source def/aris30/aris30_trk.tcl
```

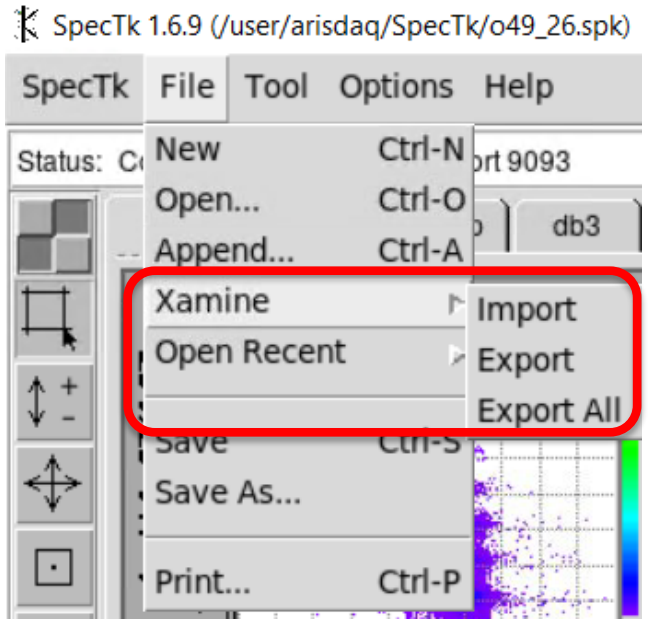
- Load ARIS30_LIST file, then save to file with other name (here all_def_01)

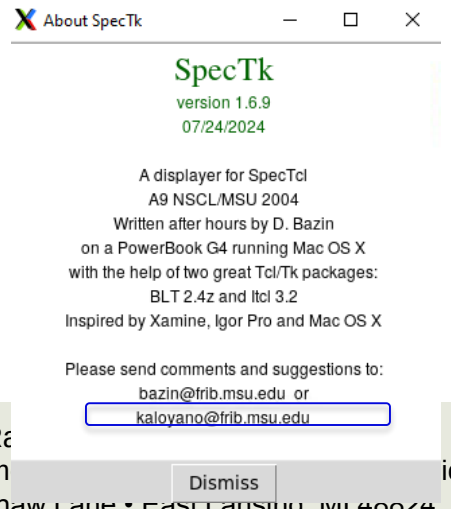


Revision of SpecTk windows file compatible to all_def_01.tcl



SpecTk ←→ Xamine





Development and support by Daniel Kaloyanov

https://lise.frib.msu.edu/porting/assistance_team.html#Daniel