

Parameters using the Focal Guidance Program

Calculations for up to four Q lenses (Lenses 1–4 from upstream to downstream).

Lenses 1 and 2 had the same specifications and called them QS1 and QS2.

Lenses 3 and 4 had the same specifications and were called QT1 and QT2.

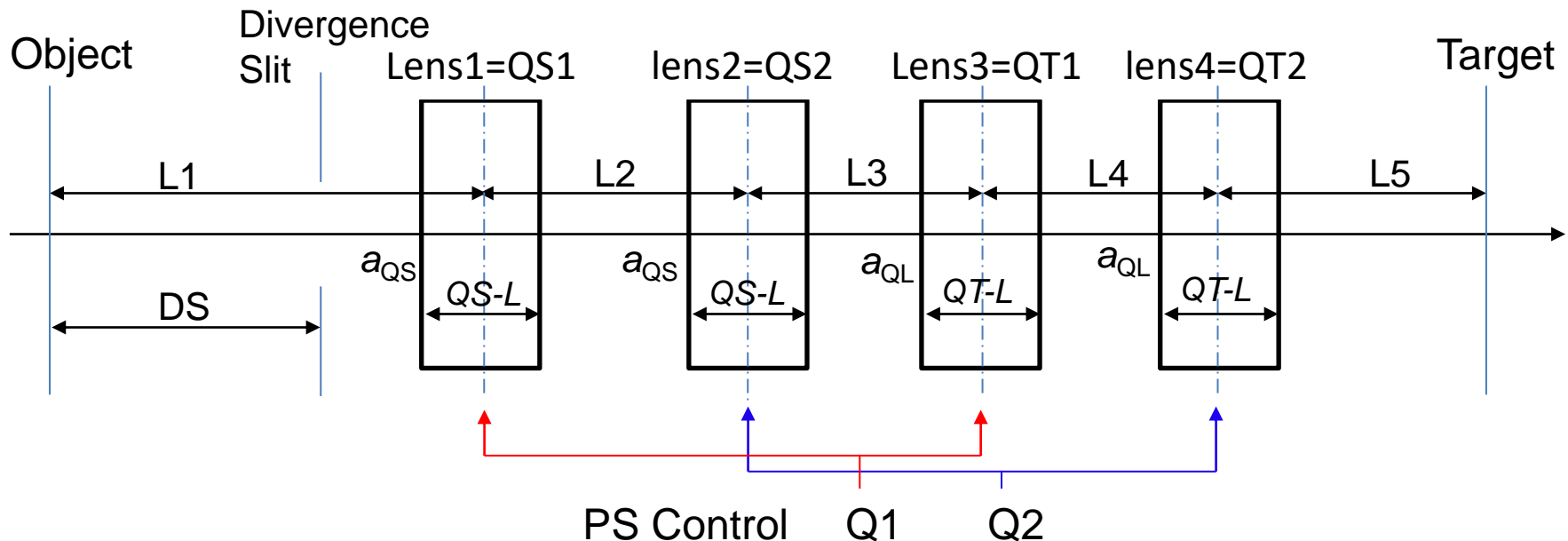
Coupled Lenses 1 (QS1) and 3 (QT1) with Lenses 2 (QS2) and 4 (QT2) (13–24 coupling).

Coupled Lenses 1 (QS1) and 4 (QT2) with Lenses 2 (QS1) and 3 (QT1) (14–23 coupling).

The polarity of the coupling CC, DD, CD, or DC with respect to the x-axis.

Lenses 3 (QT1) and 4 (QT2) are always used.

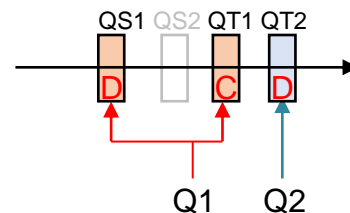
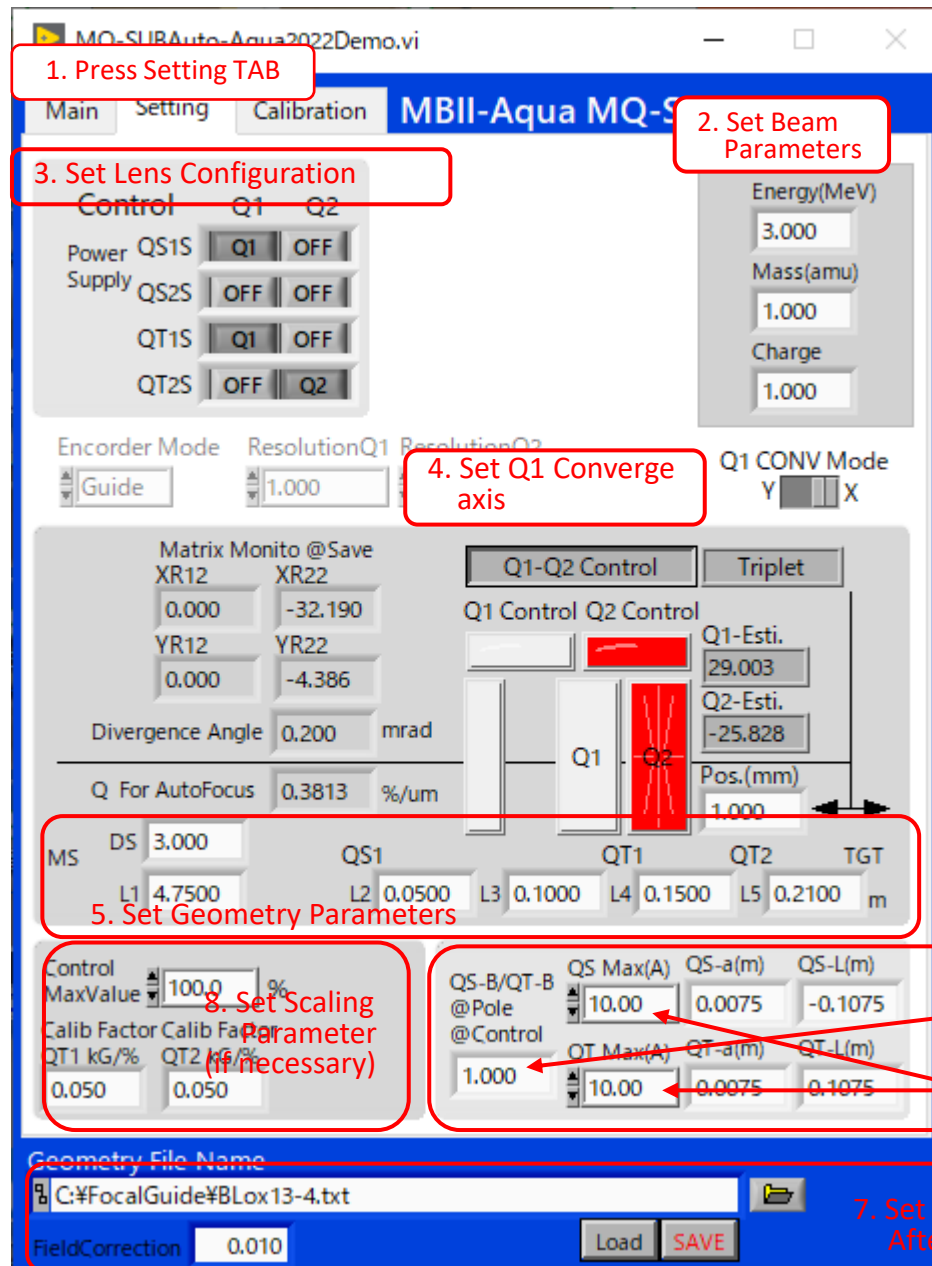
The geometry parameters were shown.



a_{QS} , a_{QL} : bore radius

QS-L, QT-L: effective length of the quadrupole (mechanical length + $1.1a$)

Parameter Setup (Ex. DC-D triplet arrangement with 13 (QS1-QL1) coupling)

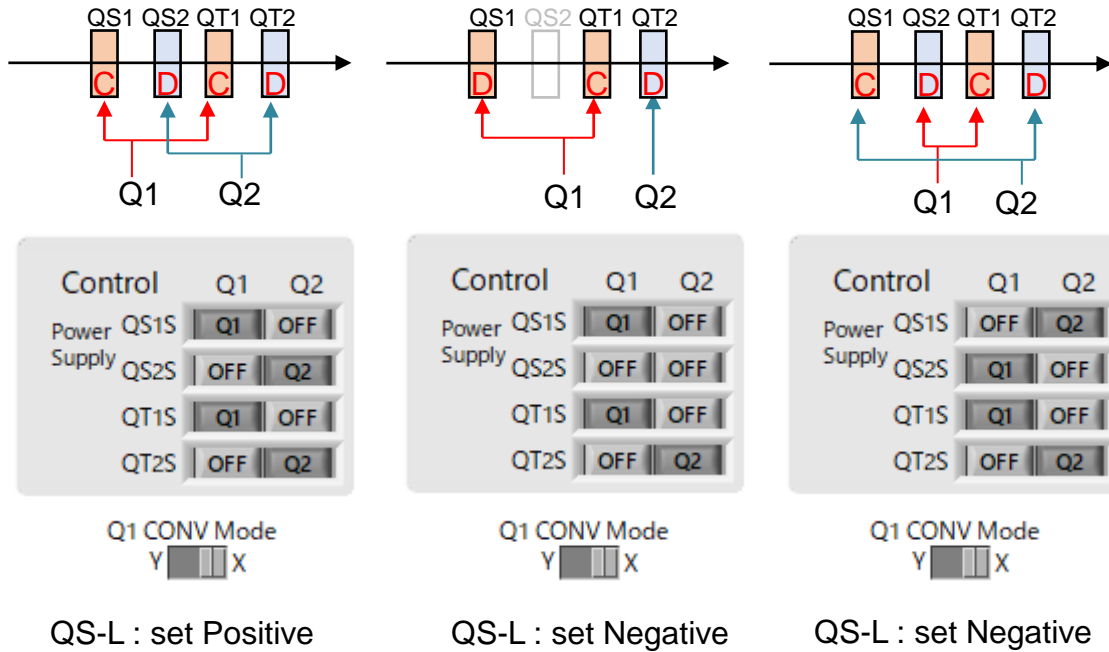


1. Select setting TAB.
2. Set Lens configuration.
3. Set Beam parameter.
4. Set Q1 converge axis (X or Y)
5. Set geometry parameters
6. Set lens parameters (QS, QT)
7. Select Parameter file, and press Load/SAVE (if necessary).
8. Set Scaling Parameter for Main Tab (if necessary).

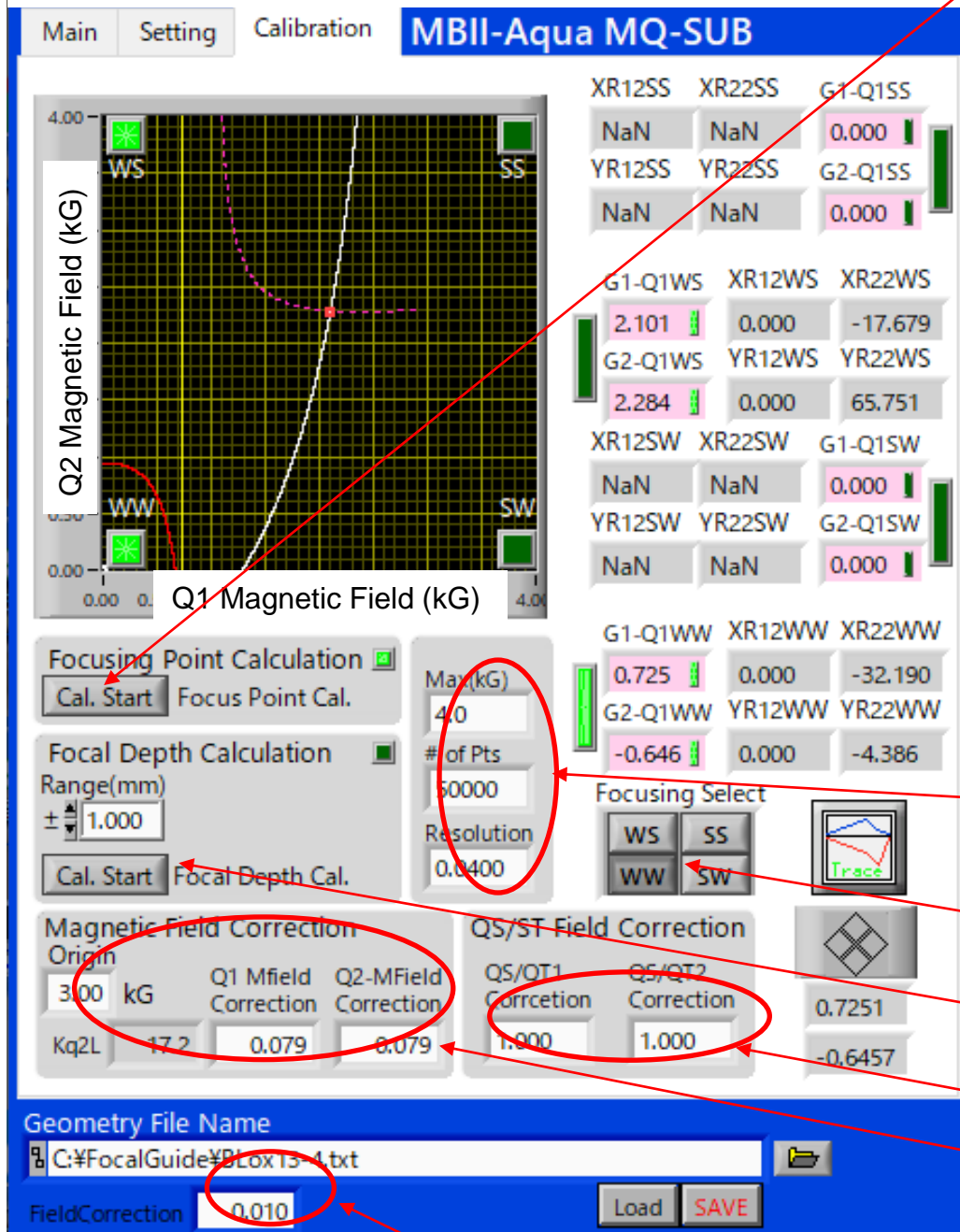
6. Set Lens Parameters (QS and QT)
Magnetic field ratio of QS and QT @ Pole @ Control
(unity for the same specification)
Maximum Current for QS and QT

7. Set Geometry Parameter File (if necessary)
After that, press Load or SAVE

Example for Multi-lens system.



Calculation of Magnetic fields at convergence



Calculation of Focusing Magnetic Field

R12/R22/Magnetic Field(kG)
 (With Crossover for both axes:SS)

Magnetic Field(kG) / R12/R22
 (Crossover for X

w/o Cross over for Y:WS)

R12/R22/ Magnetic Field(kG)
 (w/o Crossover for X

Cross over for Y:WS)

Magnetic Field(kG) / R12/R22
 (w/o crossover for both axes, WW)

Maximum value of magnetic field,
 number of plots, accuracy
 (calculated automatically)

Focus Selection

(This magnetic field is stored in memory)

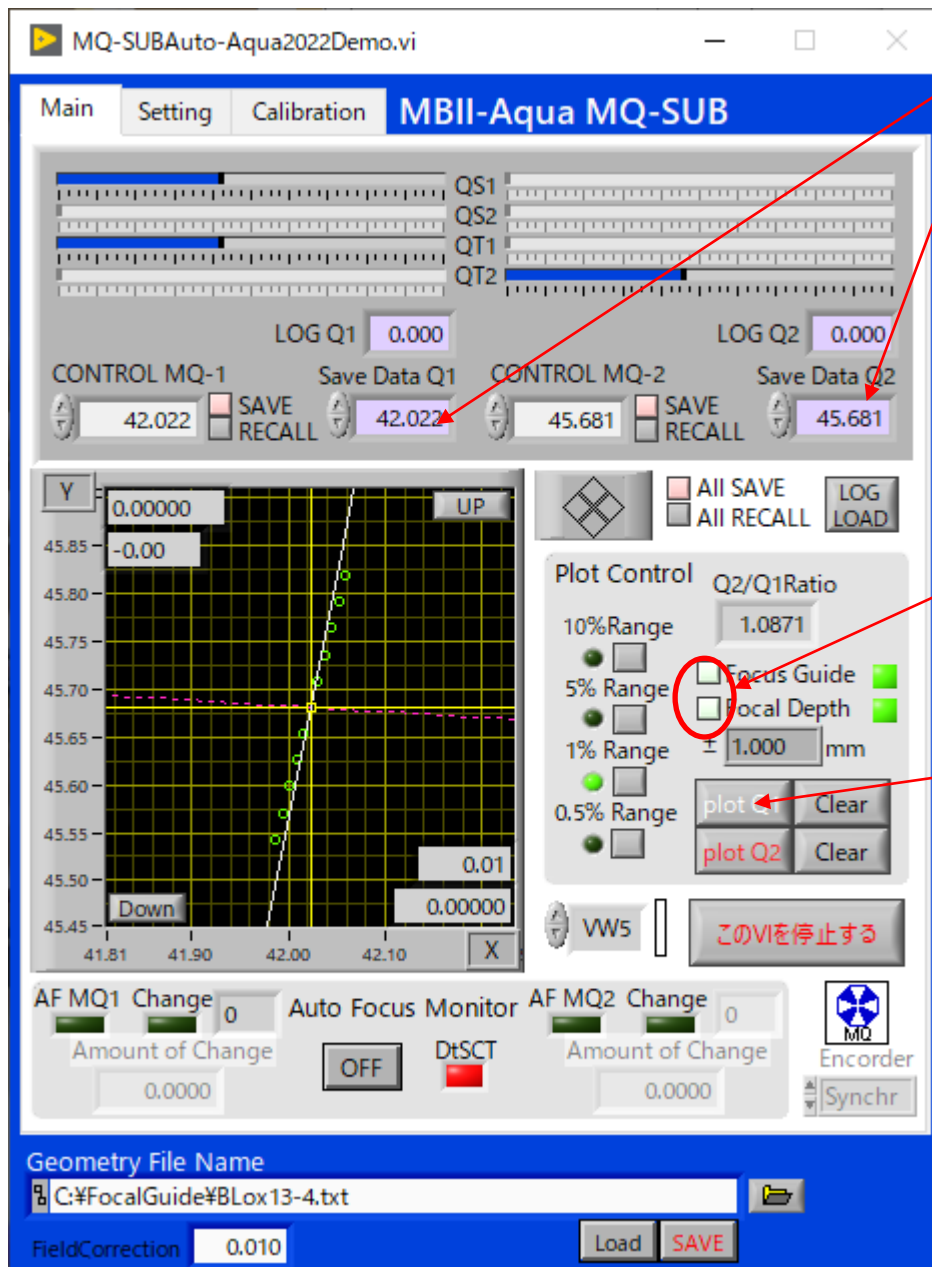
calculation for depth of focus

QS1/QT1、 QS2/QT2 correction

(unity for the lenses with same spec.)

Sin correction

It is automatically calculated for the value of FieldCorrection.If
 Origin is significantly different from the focusing field, enter the
 value manually.

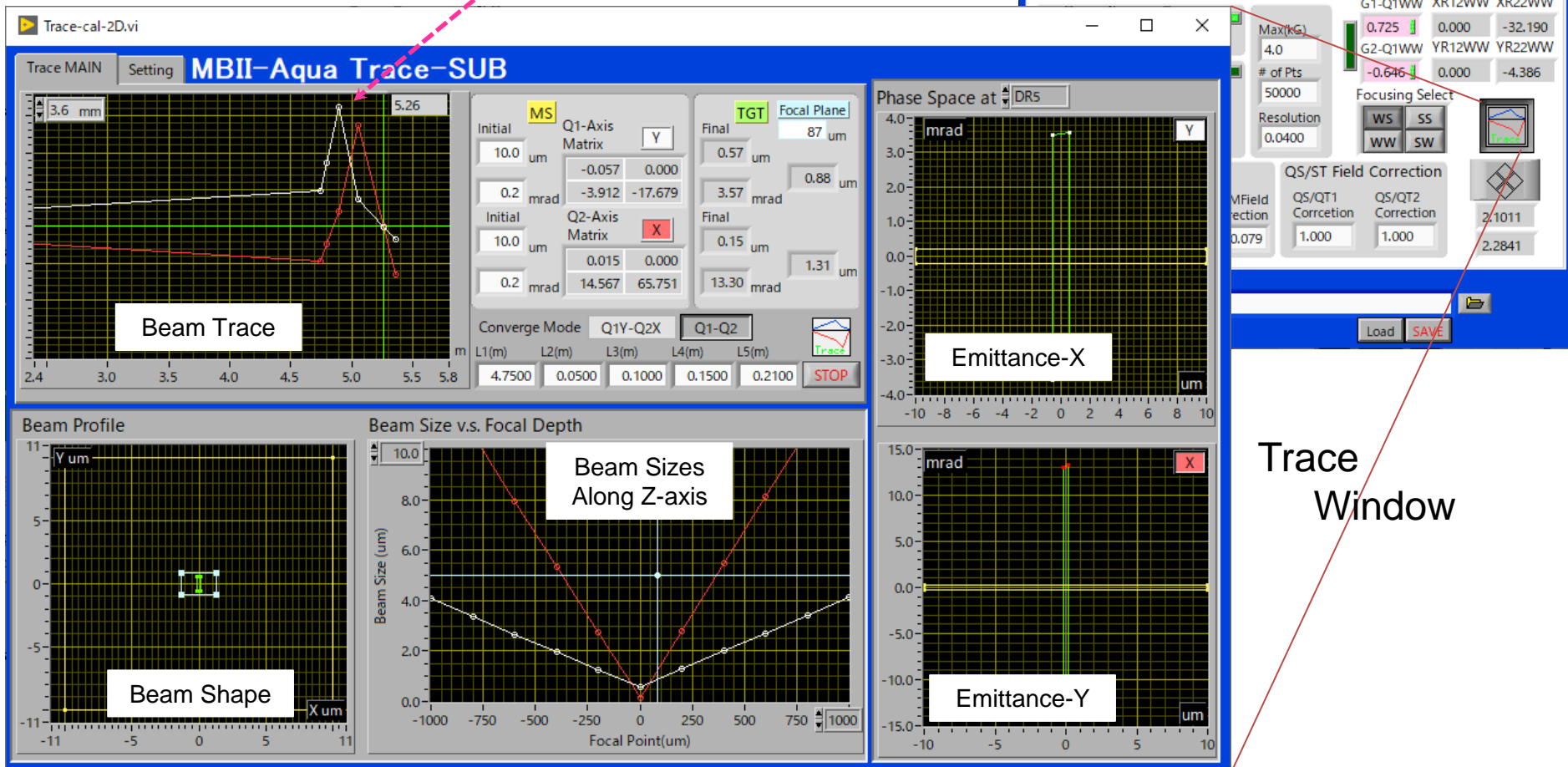
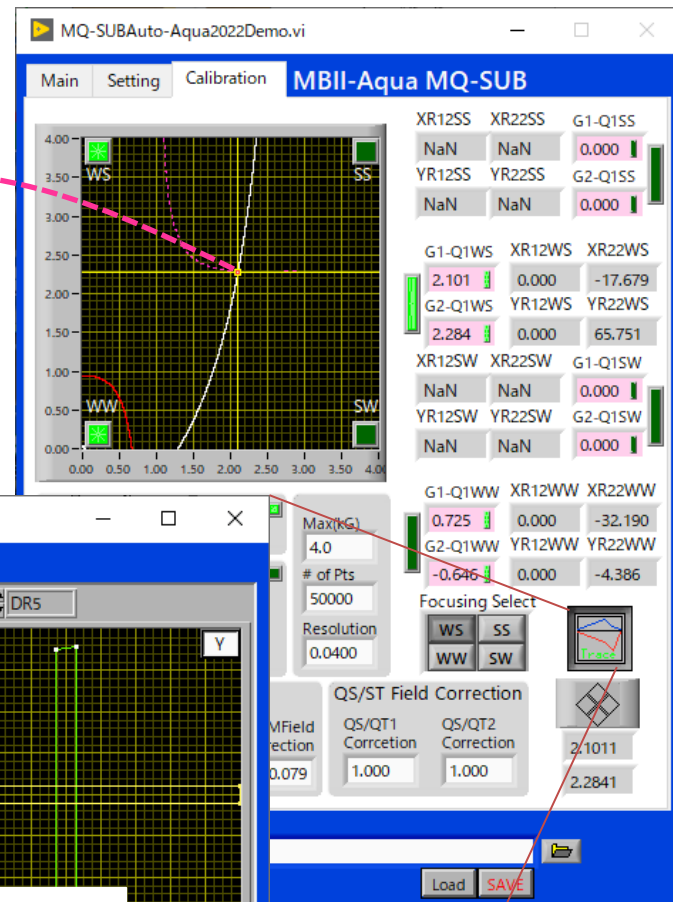


Calculated value is stored in memory
(converted to kG-% by calibFactor)

Reflects calculated values on palette
(Saved values are normalized as focus)

Reflects calculated values on palette
(Saved values are normalized)

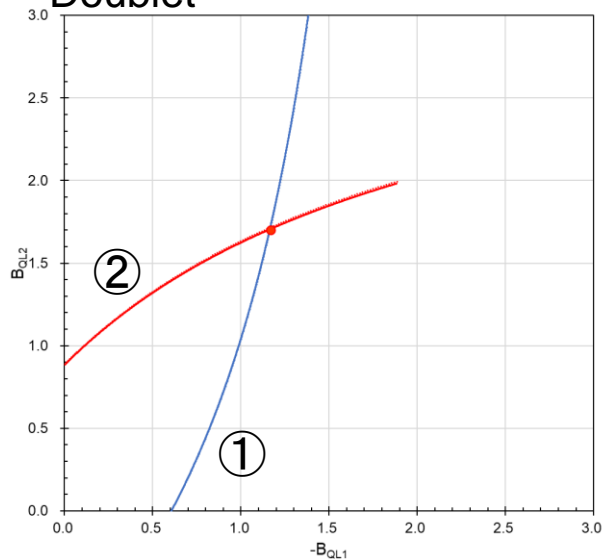
Trace Calculation at
any magnetic fields
(drag and drop / cursor)



Trace
Window

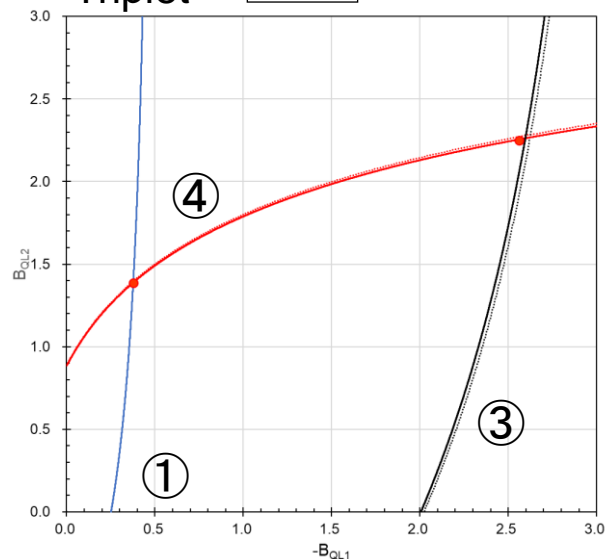
QS1 QS2 QL1 QL2

Doublet



QS1 QS2 QL1 QL2

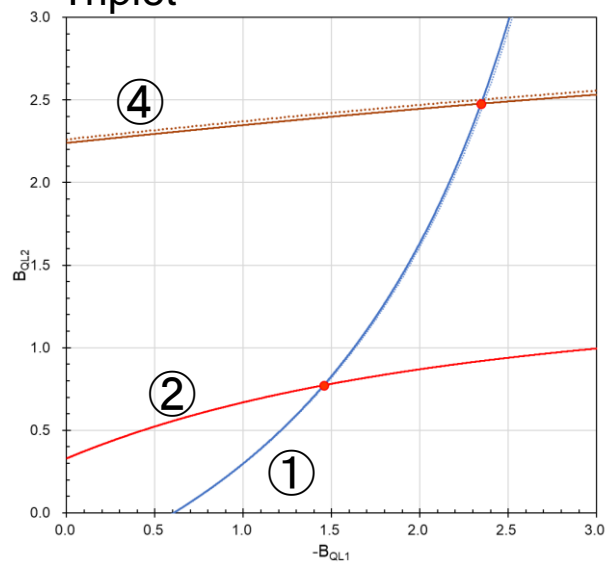
Triplet



.... $1/f=G1=-Kq^2/(Kq^2)^2/6$ (2nd approx.)
 — $1/f=G1=-Kq^2/(Kq^2)^2/6+\delta$ (sine corr.)
 • Transport

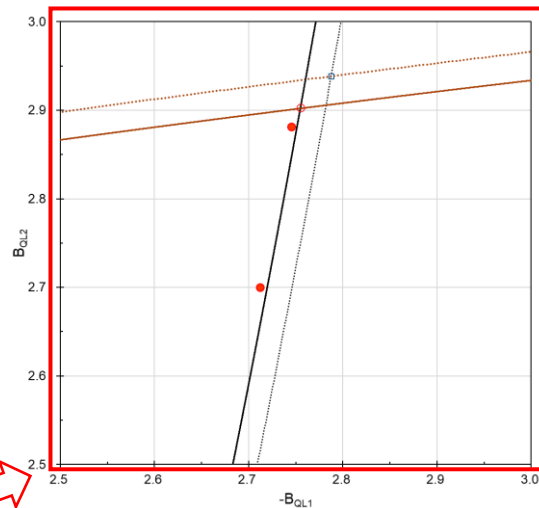
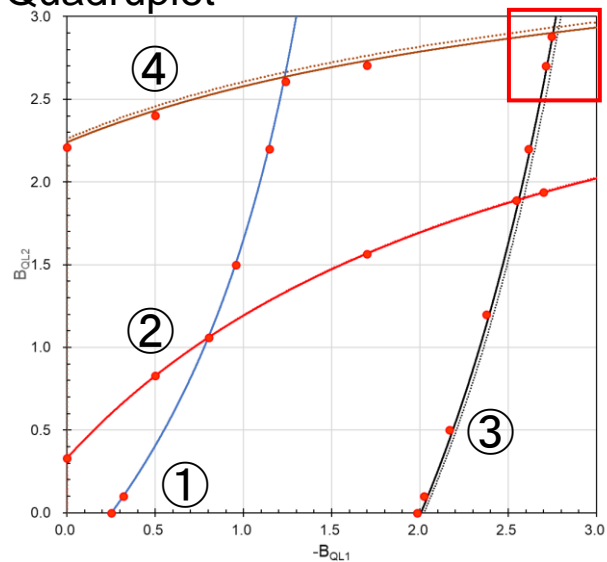
QS1 QS2 QL1 QL2

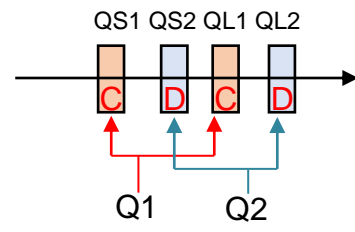
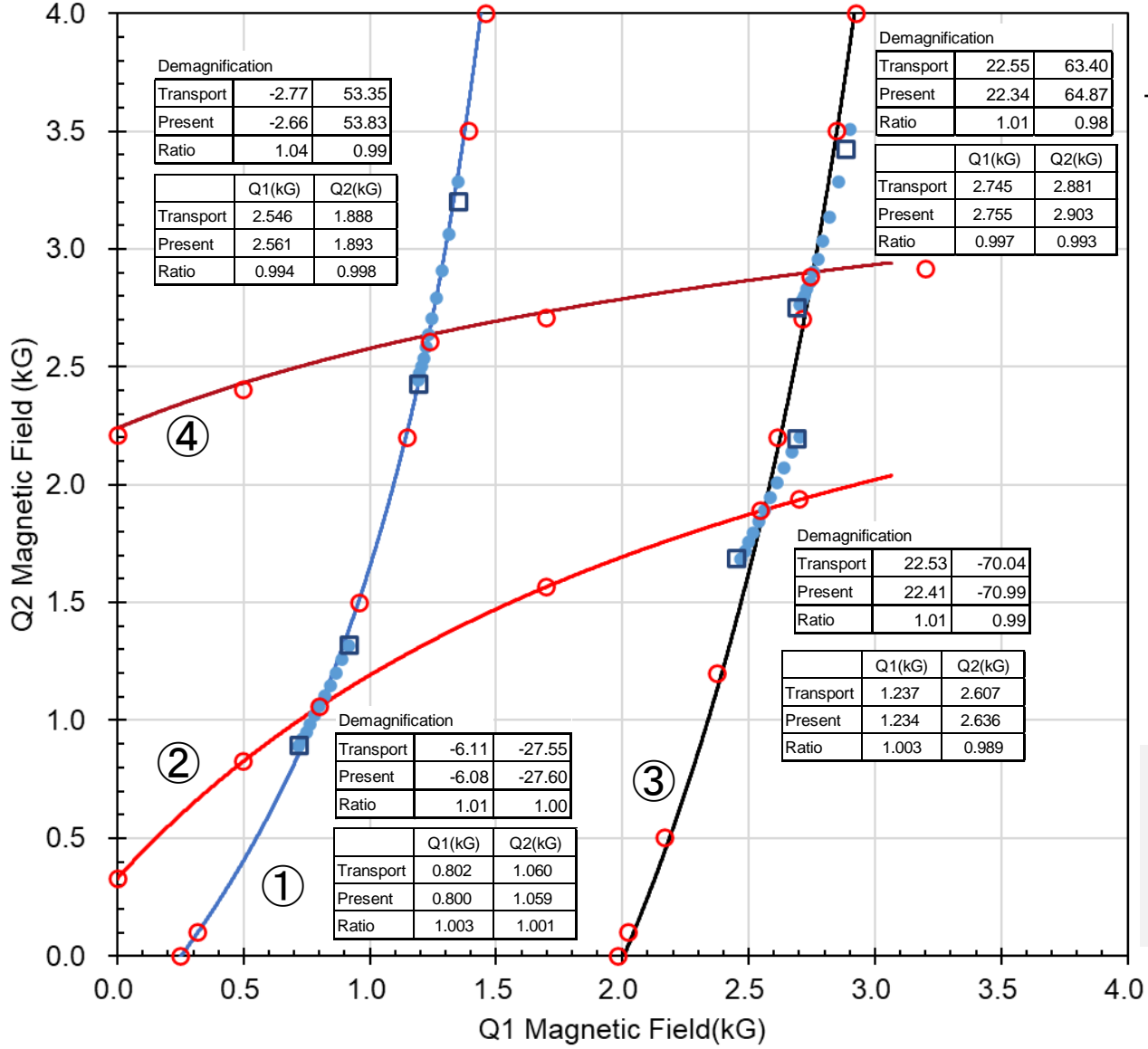
Triplet



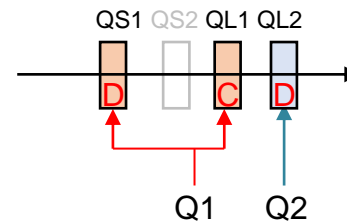
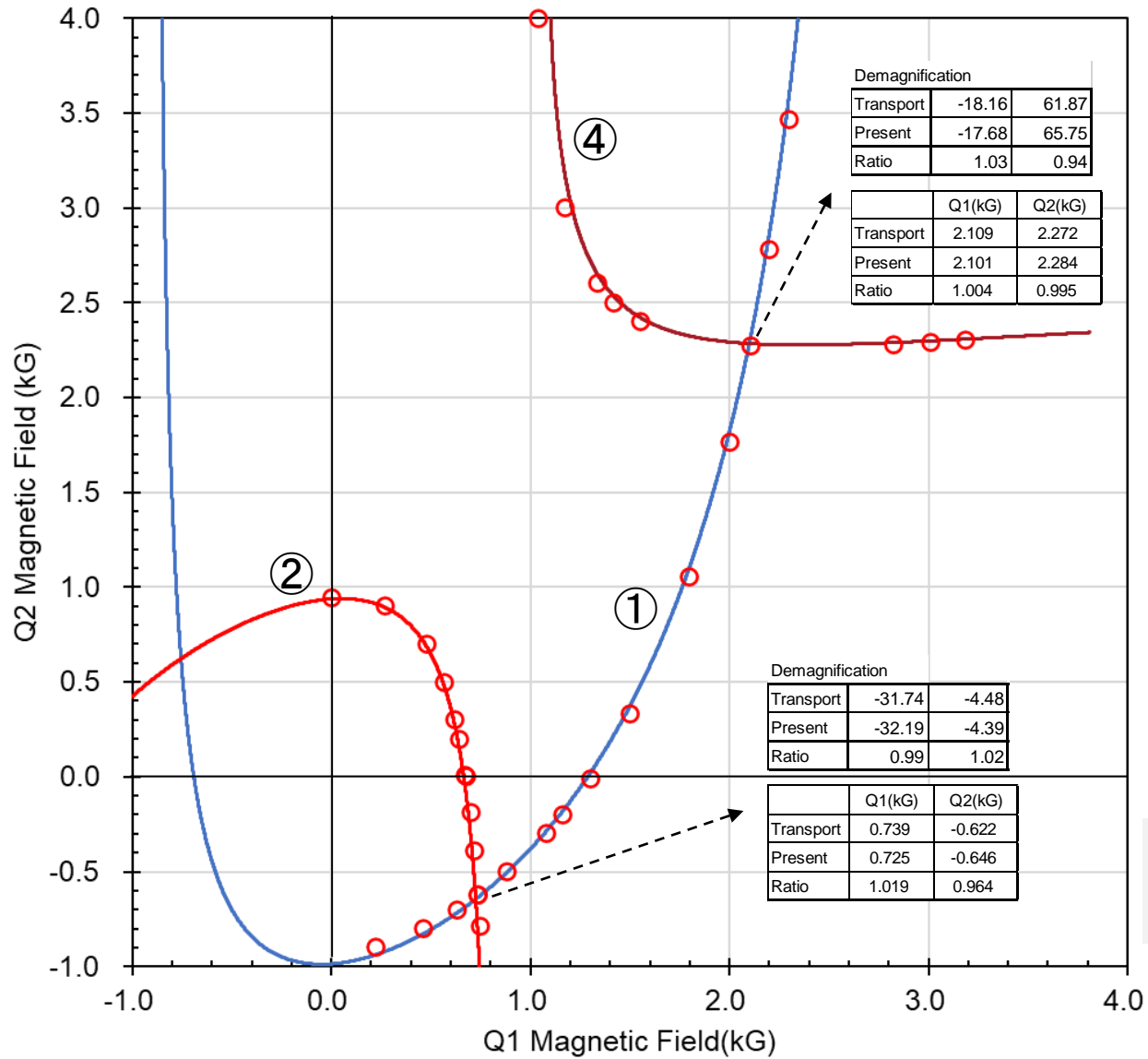
QS1 QS2 QL1 QL2

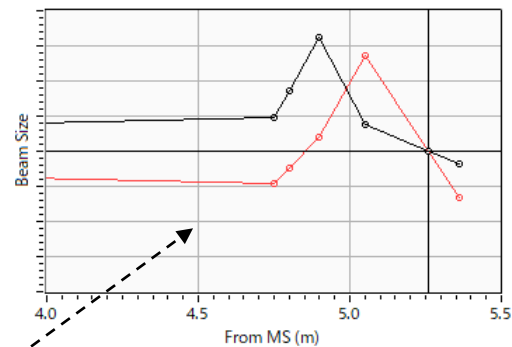
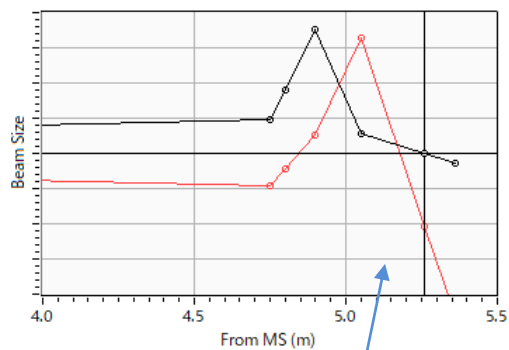
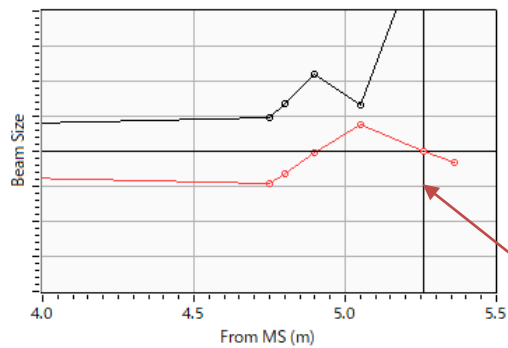
Quadruplet



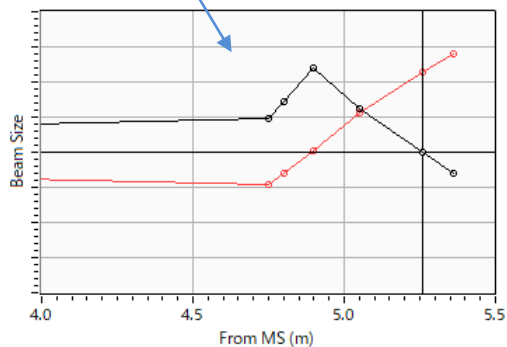
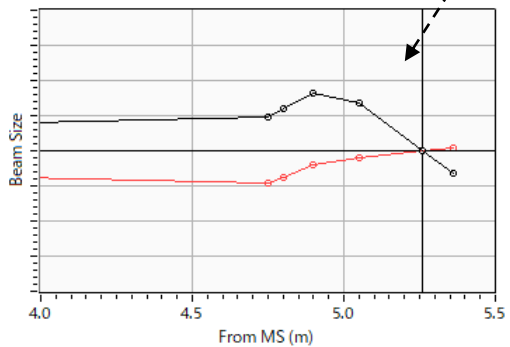
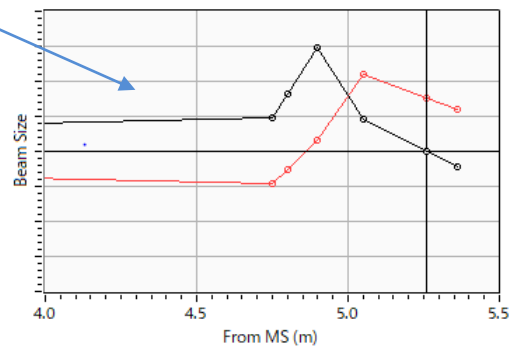
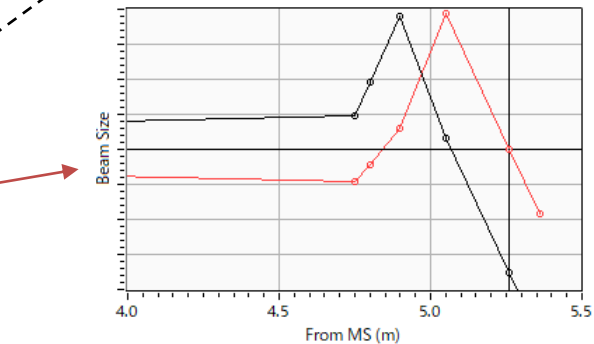
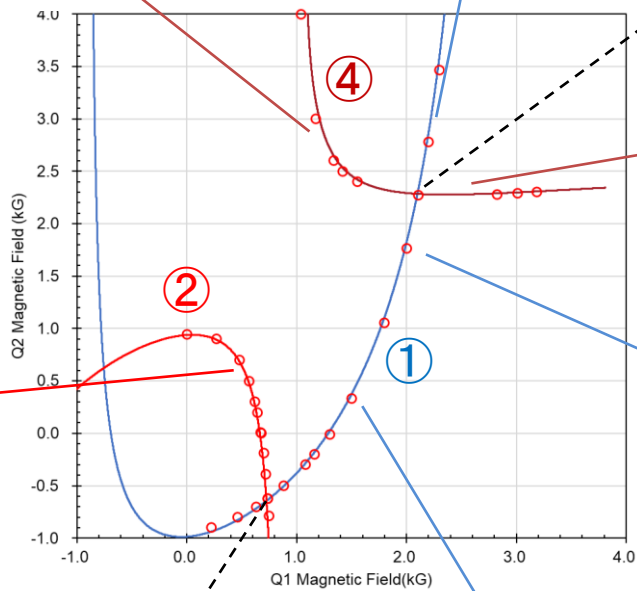
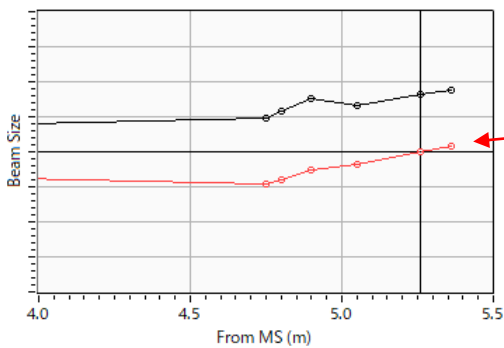


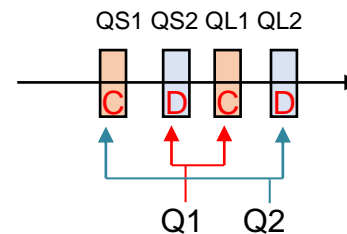
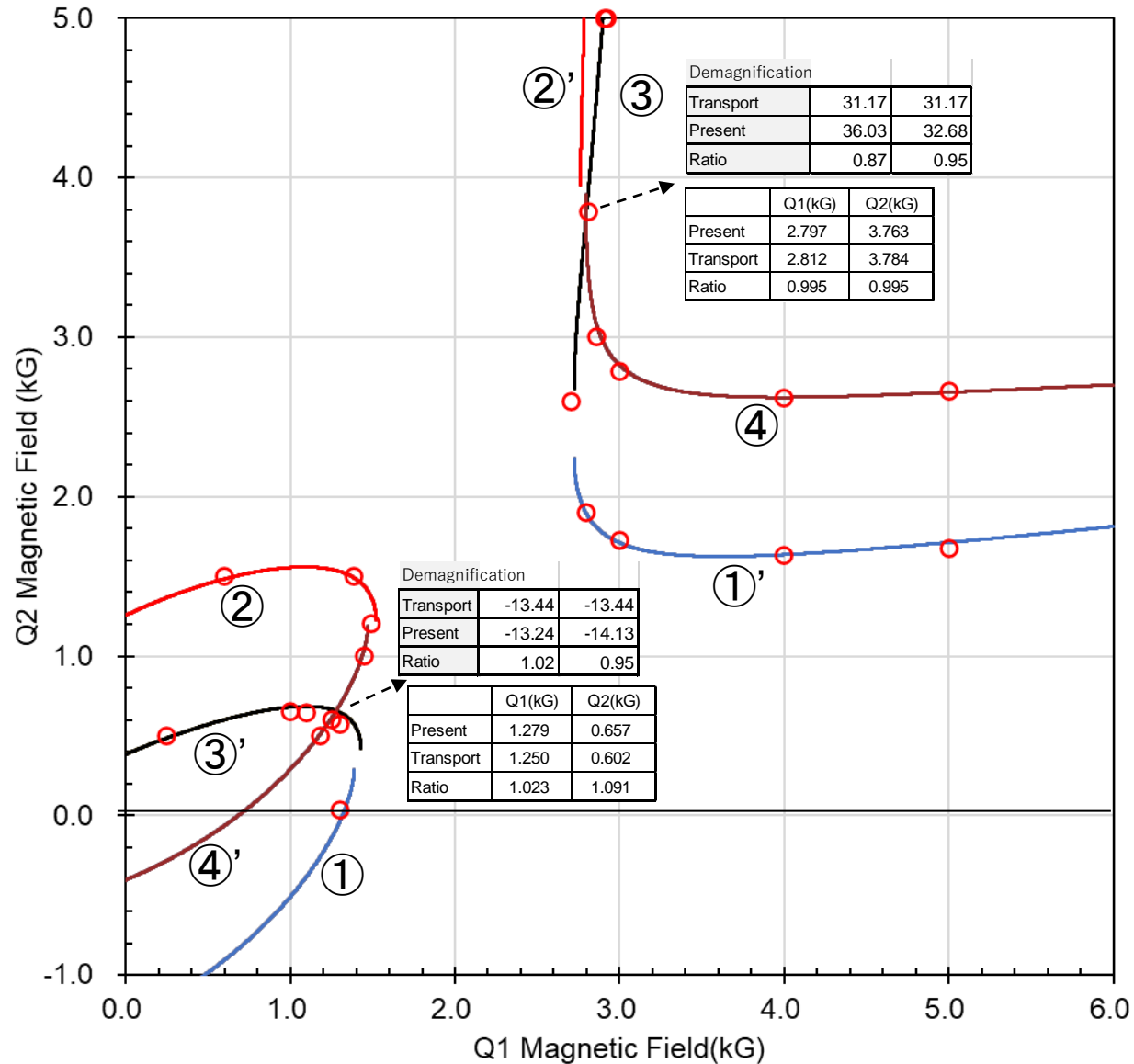
- ① X-Focus (wo Cross Over)
- ② Y-Focus (wo Cross Over)
- ③ X-Focus (w Cross Over)
- ④ Y-Focus (w Cross Over)
- Transport
- Present(± 100mm in 10mm Step)
- Transport(± 100mm)

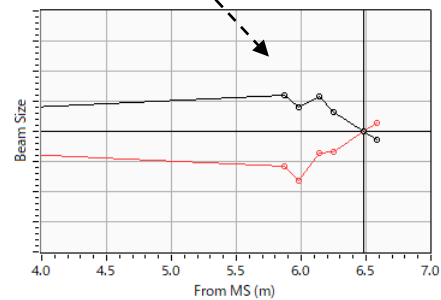
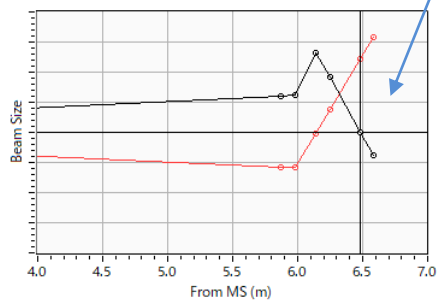
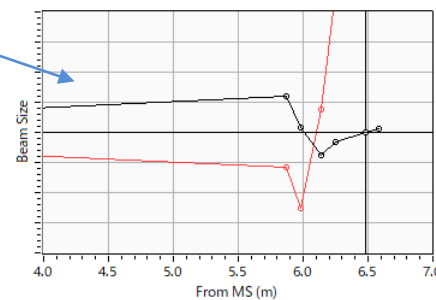
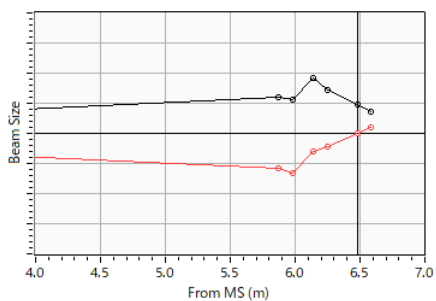
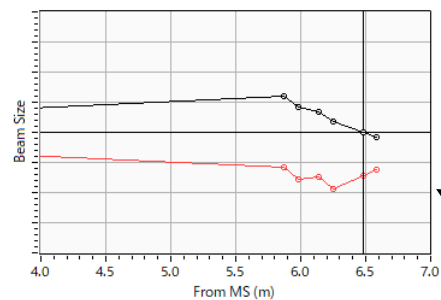
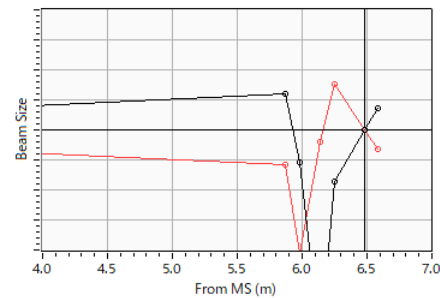
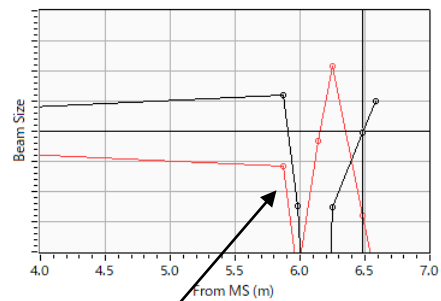
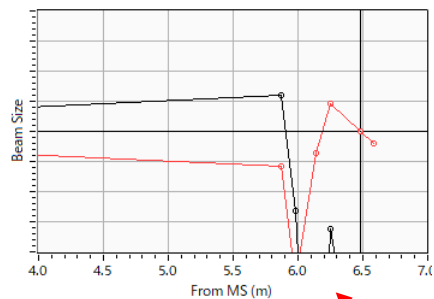
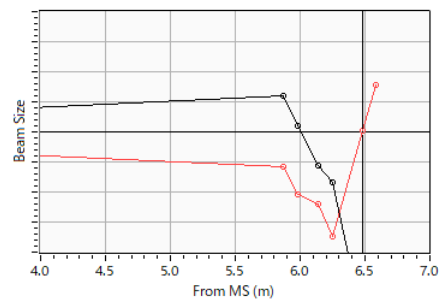




— Trace X
— Trace Y







— Trace X
— Trace Y

