# S-2S meeting

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# Contents

What to do

# What to do

## TOF detector

- Gean4 simulation about the configuration (Updated) → pdf
- Frame
  - Almost all parts were ordered (→ pdf) and arrived.
  - Test assembling is in progress at Rm.131.
- TOSCA calculation for the magnetic field shield → pdf

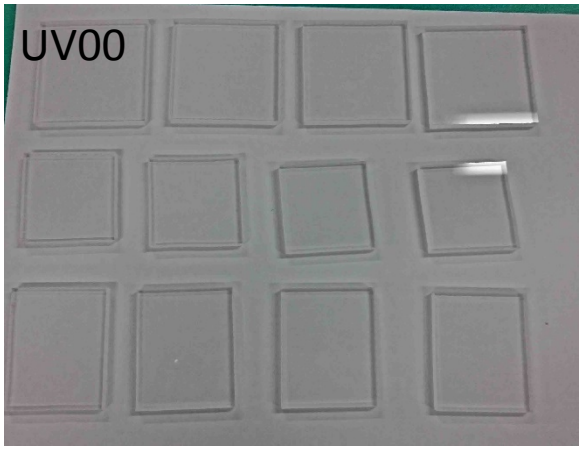
## Water Cherenkov detector

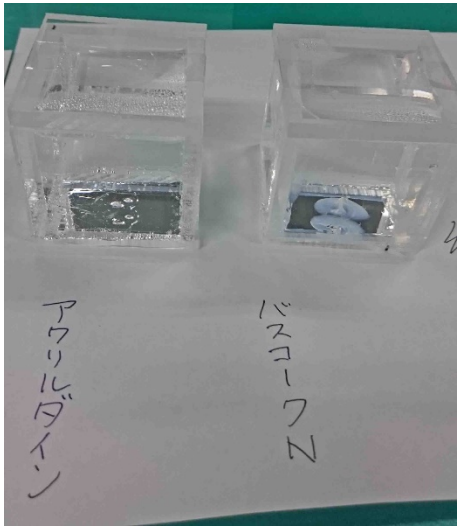
- Updated Monte Carlo simulation for estimations of K+ and p survival ratios → pdf
- Consistency check of a window test analysis → pdf
- TOSCA calculation for the magnetic field shield was just started.
  - Iron shield ( or/and bucking coil)
- All materials of actual WC were arrived except for a container.
  - The container will be delivered this week. → Assembling will be started !!
- アクリルダイン/バスコークNの水への染み出しによる透過率変化の測定 (at Rm.131)
  - Data have been taken for a week, and will be kept being taken more.

## Transfer matrix optimization study

- Checking an S-2S optics before this study.

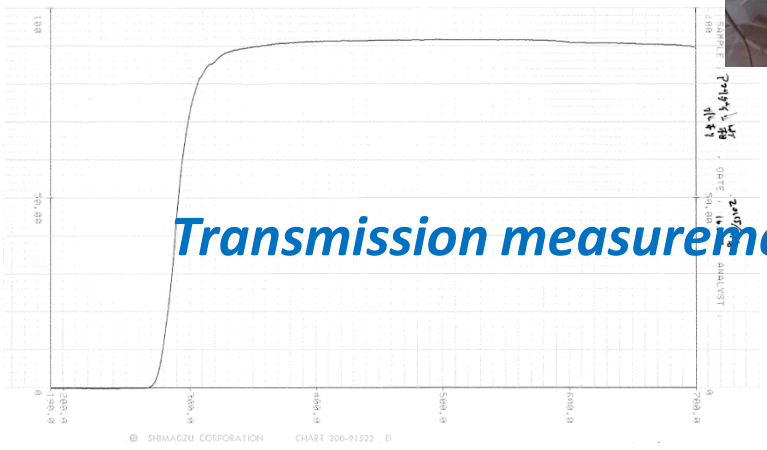
# Transmission test at Rm.131







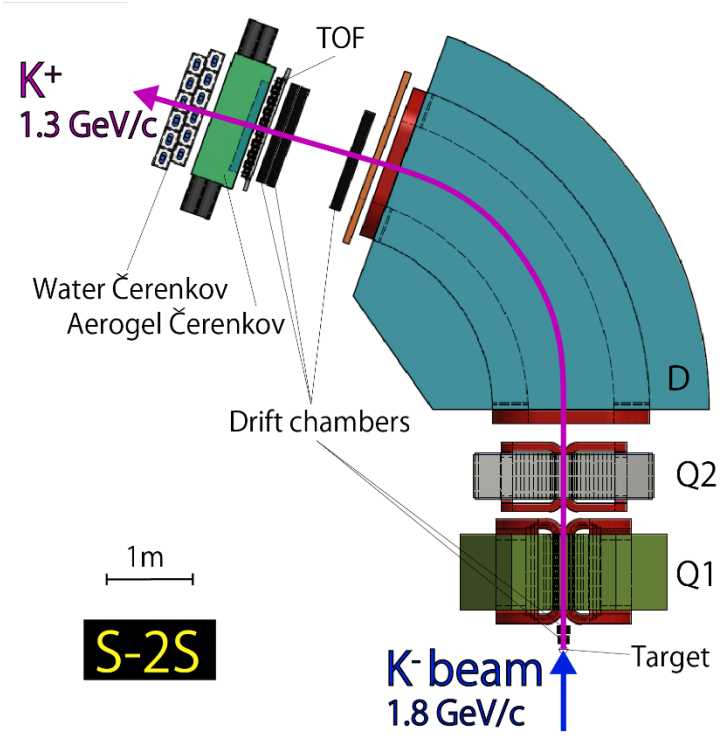


***Transmission measurement***

# TOF frame test assembly


# S-2S Geant4 simulation

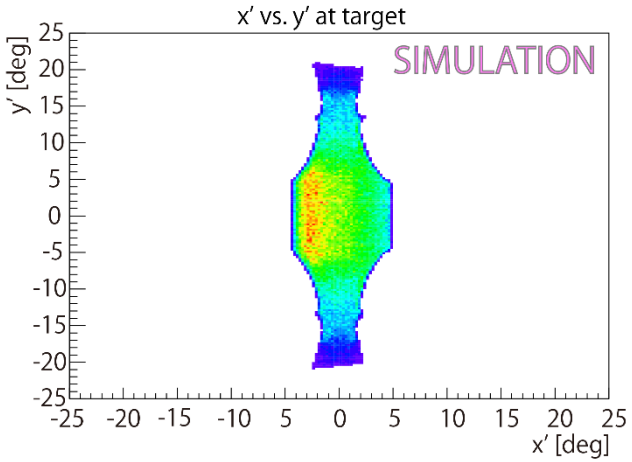
- Field map: Stsmap2500A.dat
- Scaling factor for the field: 1.0
- Geometry: DCgeom.RealSts
- Momentum: $1.3 \pm 0.4$ GeV/$c$ (Uniform)
- Angle: 0 – 25 deg (Spherical uniform)
- Particle: $K^+$
- Distance between Q1 and target: 600 mm
- Material: OFF (vacuum world)

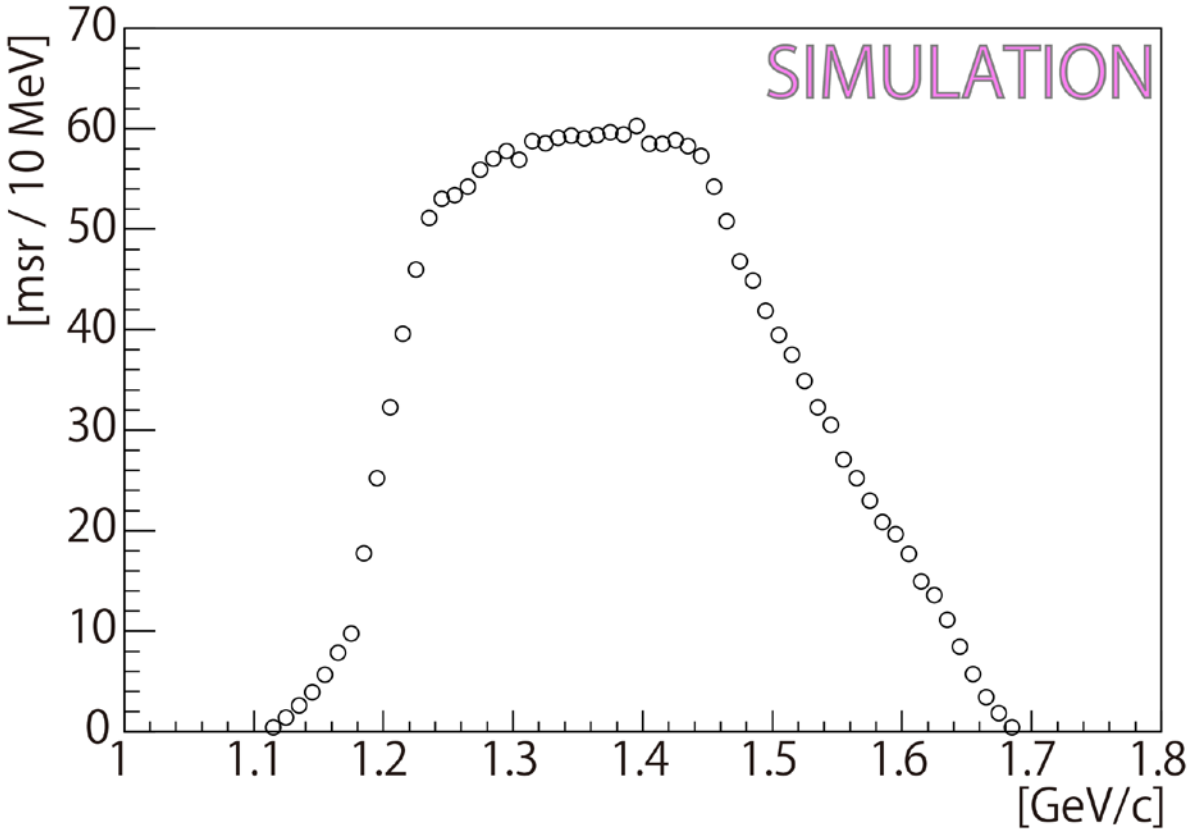


# Solid angle of S-2S

**Selection conditions:**

- Pass through Q1 and Q2
- Hit TOF
- Hit WC

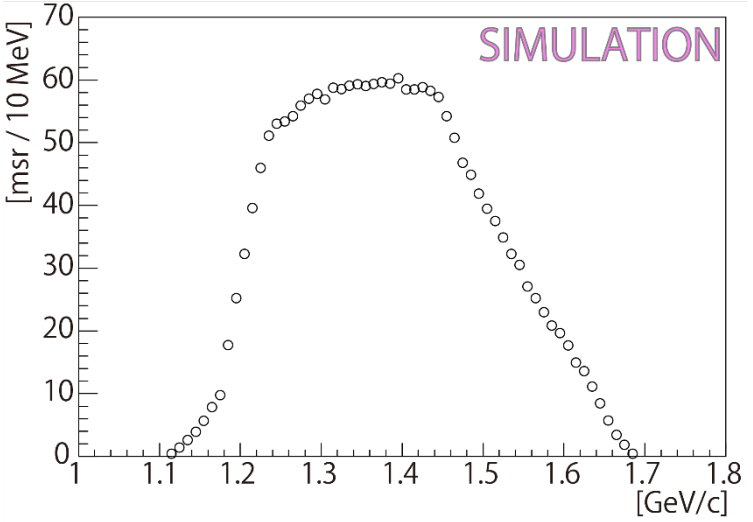


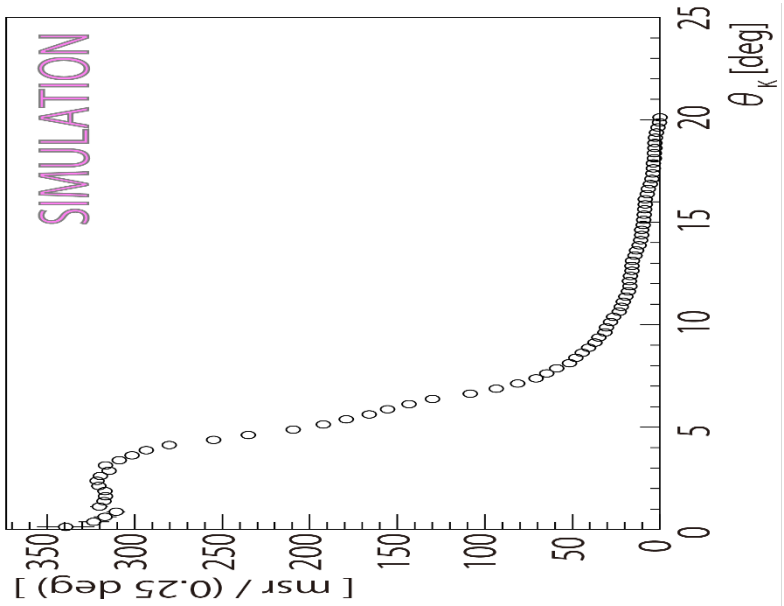



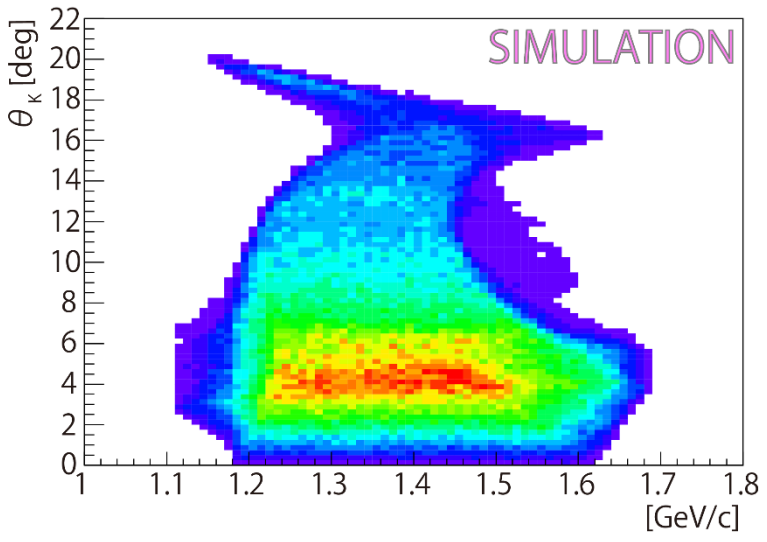
# Momentum vs. scattering angle

**Selection conditions:**

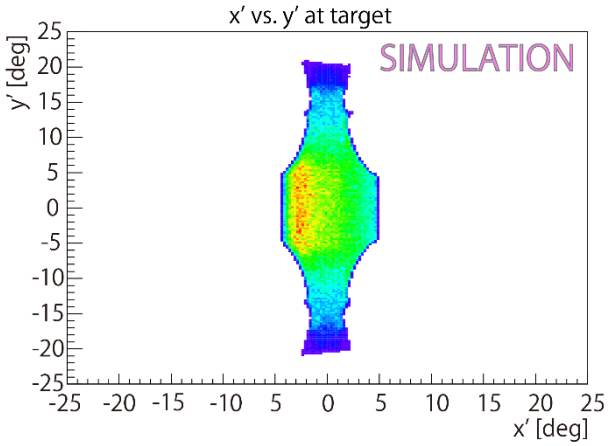
- Pass through Q1 and Q2
- Hit TOF
- Hit WC

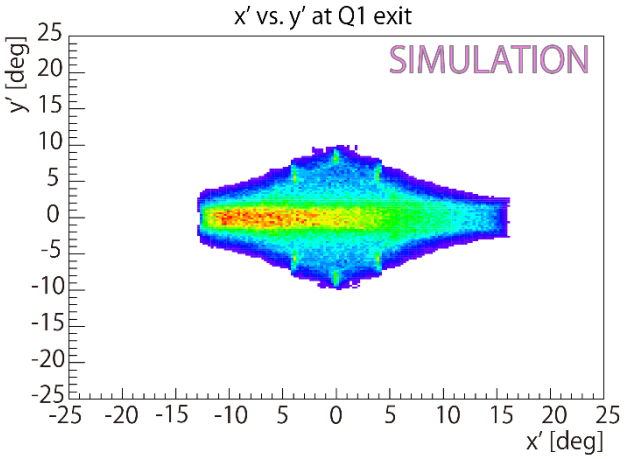


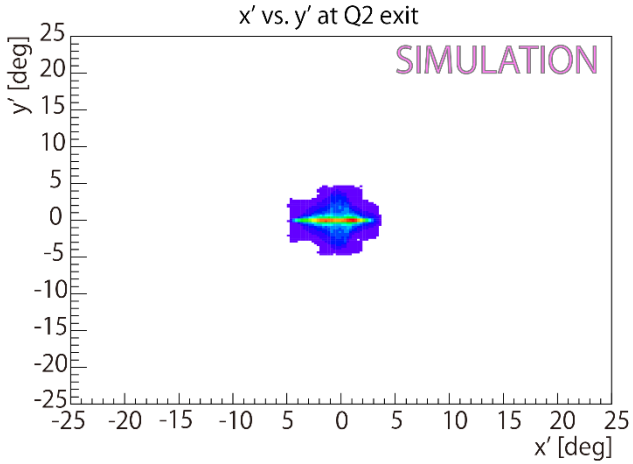



# x’ vs. y’ distributions



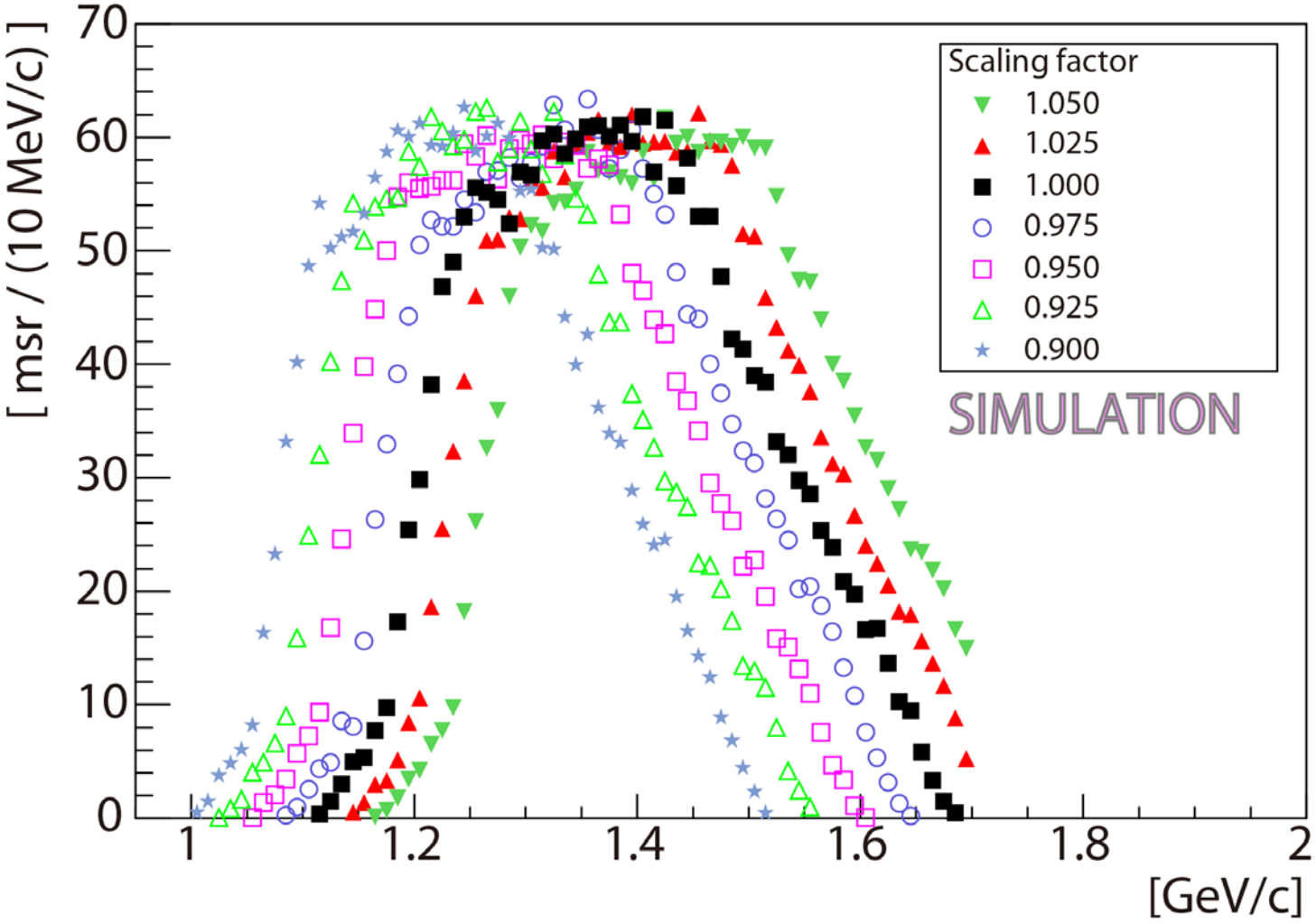

At target

At Q1 exit

At Q2 exit

# Backup

# Solid angle of S-2S with different scaling factors of magnetic field

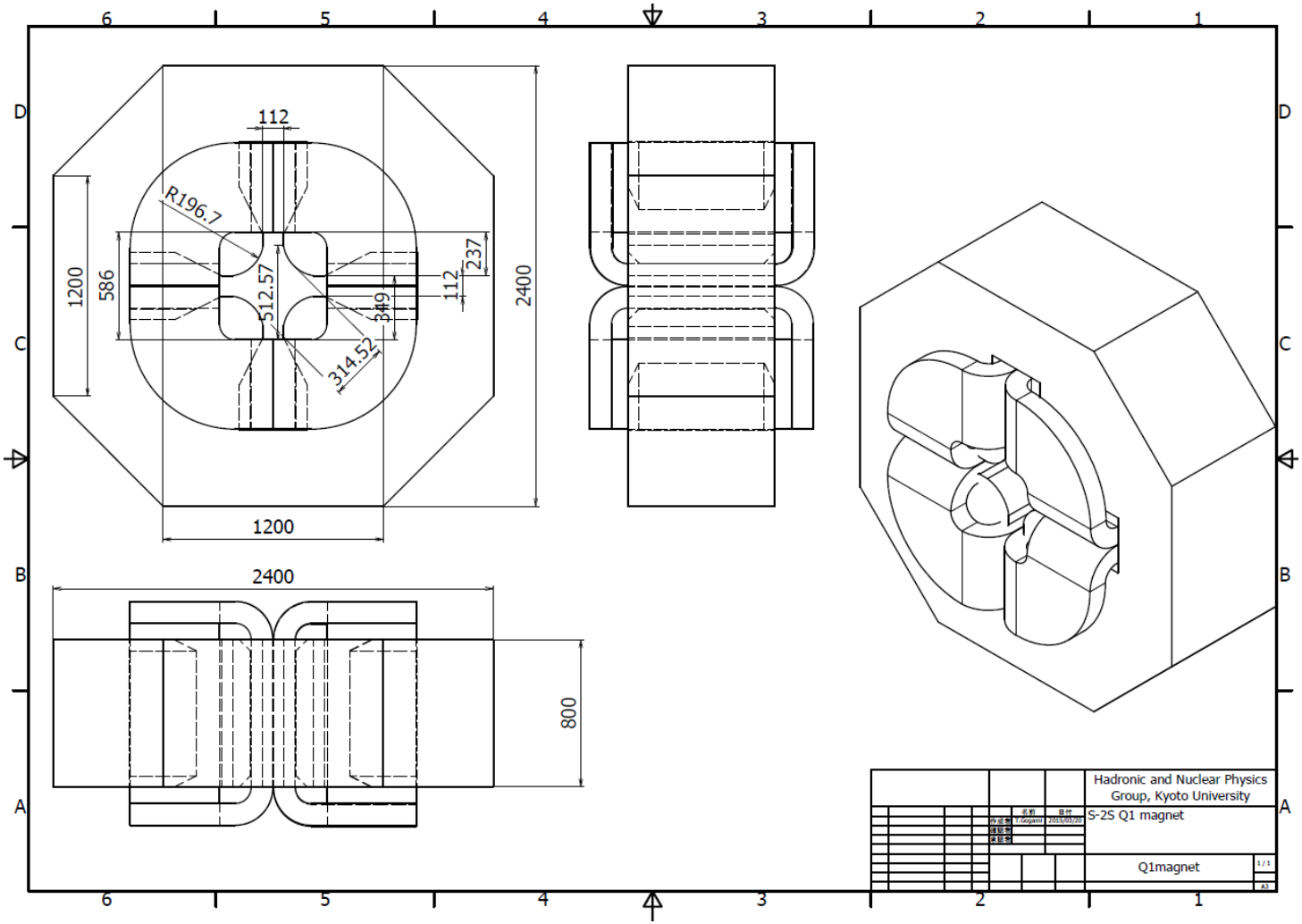


# Q1 and Q2 shapes

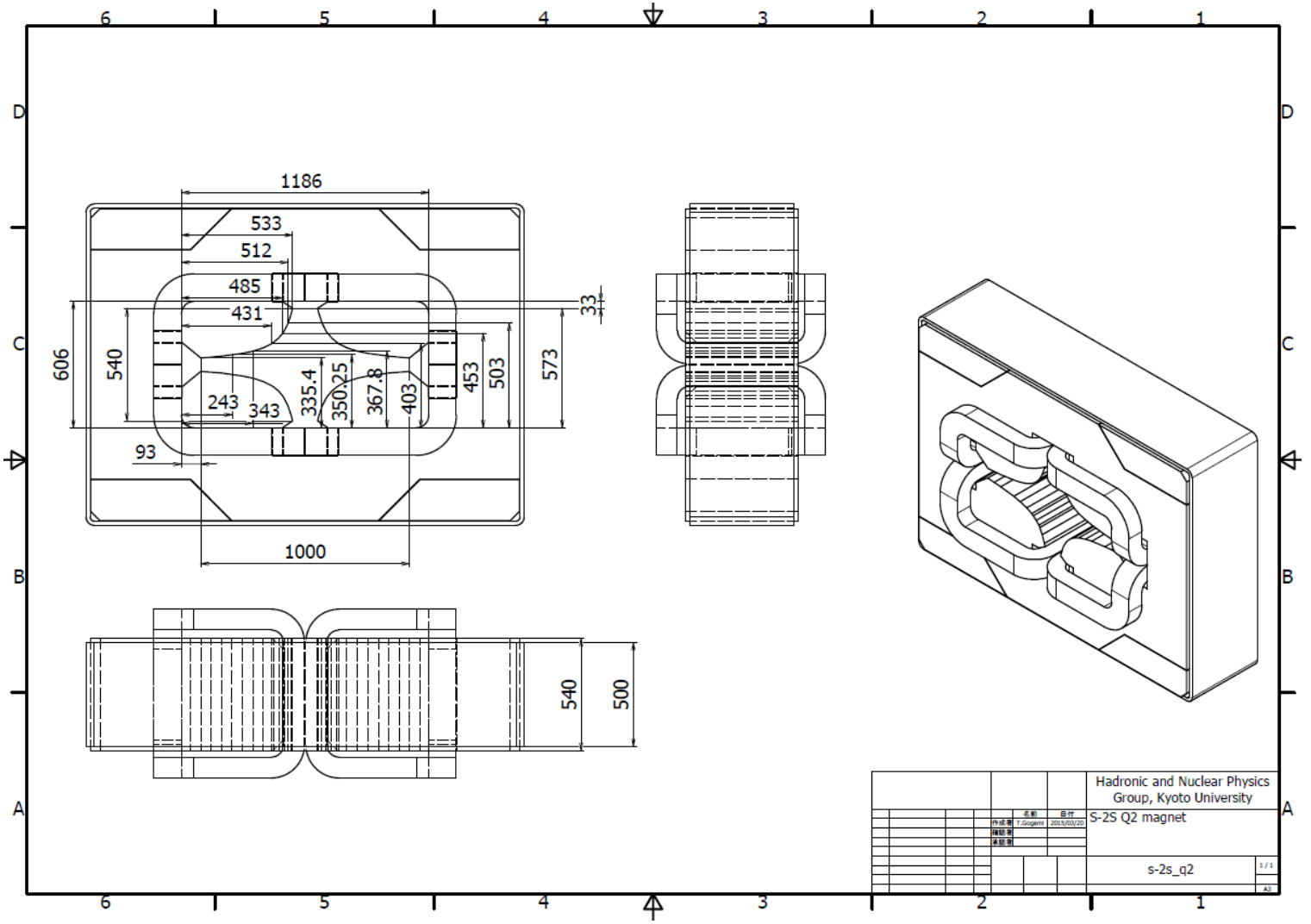
```
// ~~~~~~~~~~ Q1Flag (T.Gogami, 23Mar2015) ~~~~~~~~~~~~~~~~
G4bool Q1Flag1 = false; // Q1 entrance
G4bool Q1Flag2 = false; // Q1 exit
G4bool Q1Flag  = false;
G4double qx = event.SlitX[0]; // at Q1 entrance
G4double qy = event.SlitY[0]; // at Q1 entrance
G4double a,b,c;
a = 8.5;
b = 10429.0;
c = 109261.0;
if( ( qy<a+b/qx+c/qx/qx && qx>56.0 && qy>56.0 )     ||
    ( qy<a-b/qx+c/qx/qx && qx<-56.0 && qy>56.0 )    ||
    ( qy>-a-b/qx-c/qx/qx && qx>56.0 && qy<-56.0 )   ||
    ( qy>-a+b/qx-c/qx/qx && qx<-56.0 && qy<-56.0 )  ||
    ( -56.0<=qx && qx<=56.0 && -293.0<=qy && qy<=293.0 )||
    ( -56.0<=qy && qy<=56.0 && -293.0<=qx && qx<=293.0 )
    ){
  Q1Flag1=true;
}
else Q1Flag1=false;

qx = event.SlitX[1]; // at Q1 exit
qy = event.SlitY[1]; // at Q1 exit
if( ( qy<a+b/qx+c/qx/qx && qx>56.0 && qy>56.0 )     ||
    ( qy<a-b/qx+c/qx/qx && qx<-56.0 && qy>56.0 )    ||
    ( qy>-a-b/qx-c/qx/qx && qx>56.0 && qy<-56.0 )   ||
    ( qy>-a+b/qx-c/qx/qx && qx<-56.0 && qy<-56.0 )  ||
    ( -56.0<=qx && qx<=56.0 && -293.0<=qy && qy<=293.0 )||
    ( -56.0<=qy && qy<=56.0 && -293.0<=qx && qx<=293.0 )
    ){
  Q1Flag2=true;
}
else Q1Flag2=false;

if(Q1Flag1 && Q1Flag2) Q1Flag=true;
else Q1Flag=false;
```

```
// ~~~~~~~~~~ Q2Flag (T.Gogami, 23Mar2015) ~~~~~~~~~~~~~~~~
G4bool Q2Flag1 = false;
G4bool Q2Flag2 = false;
G4bool Q2Flag  = false;
qx = event.SlitX[2]; // at Q2 entrance
qy = event.SlitY[2]; // at Q2 entrance
a = 0.7;
b = 16073.4;
c = 5202.96;
if( ( qy<a+b/qx+c/qx/qx && qx>60.0 && qy>32.4 )     ||
    ( qy<a-b/qx+c/qx/qx && qx<-60.0 && qy>32.4 )    ||
    ( qy>-a-b/qx-c/qx/qx && qx>60.0 && qy<-32.4 )   ||
    ( qy>-a+b/qx-c/qx/qx && qx<-60.0 && qy<-32.4 )  ||
    ( -60.0<=qx && qx<=60.0 && -270.0<=qy && qy<=270.0 )||
    ( -32.4<=qy && qy<=32.4 && -503.0<=qx && qx<=503.0 )
    ){
  Q2Flag1=true;
}
else Q2Flag1=false;

qx = event.SlitX[3]; // at Q2 exit
qy = event.SlitY[3]; // at Q2 exit
if( ( qy<a+b/qx+c/qx/qx && qx>60.0 && qy>32.4 )     ||
    ( qy<a-b/qx+c/qx/qx && qx<-60.0 && qy>32.4 )    ||
    ( qy>-a-b/qx-c/qx/qx && qx>60.0 && qy<-32.4 )   ||
    ( qy>-a+b/qx-c/qx/qx && qx<-60.0 && qy<-32.4 )  ||
    ( -60.0<=qx && qx<=60.0 && -270.0<=qy && qy<=270.0 )||
    ( -32.4<=qy && qy<=32.4 && -503.0<=qx && qx<=503.0 )
    ){
  Q2Flag2=true;
}
else Q2Flag2=false;

if(Q2Flag1 && Q2Flag2) Q2Flag=true;
else Q2Flag=false;

event.Q1Trig = Q1Flag;
event.Q2Trig = Q2Flag;
```

# カット条件を作る際にもとにした図面 (Q1)

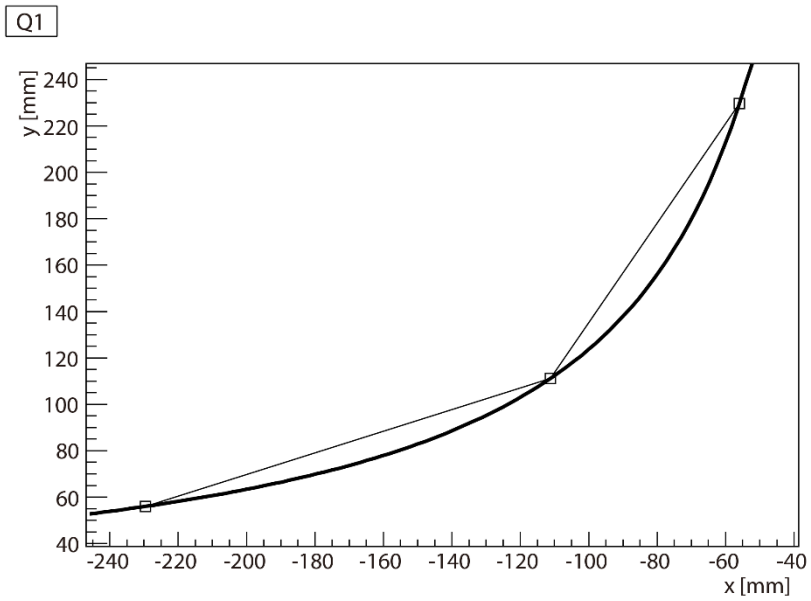


# カット条件を作る際にもとにした図面 (Q2)

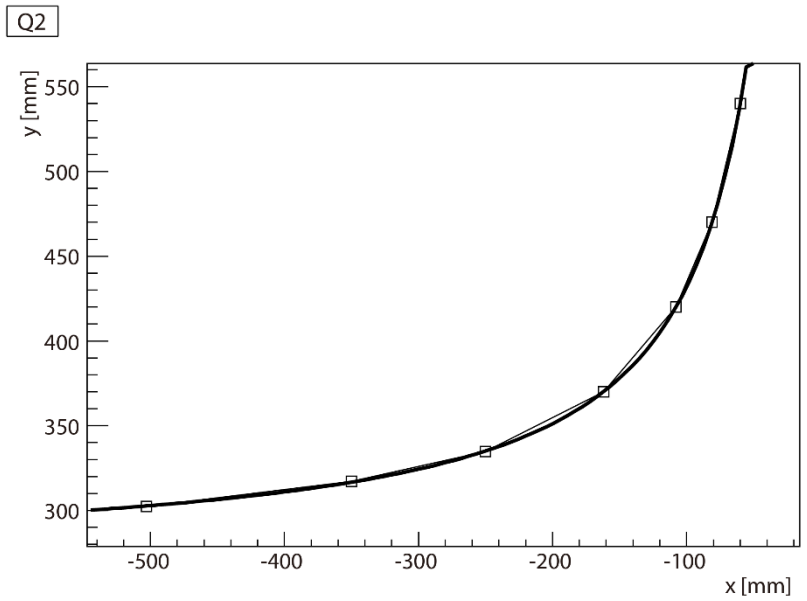


# Fitting results for Q1 and Q2

Function: $a + \frac{b}{x} + \frac{c}{x^2}$

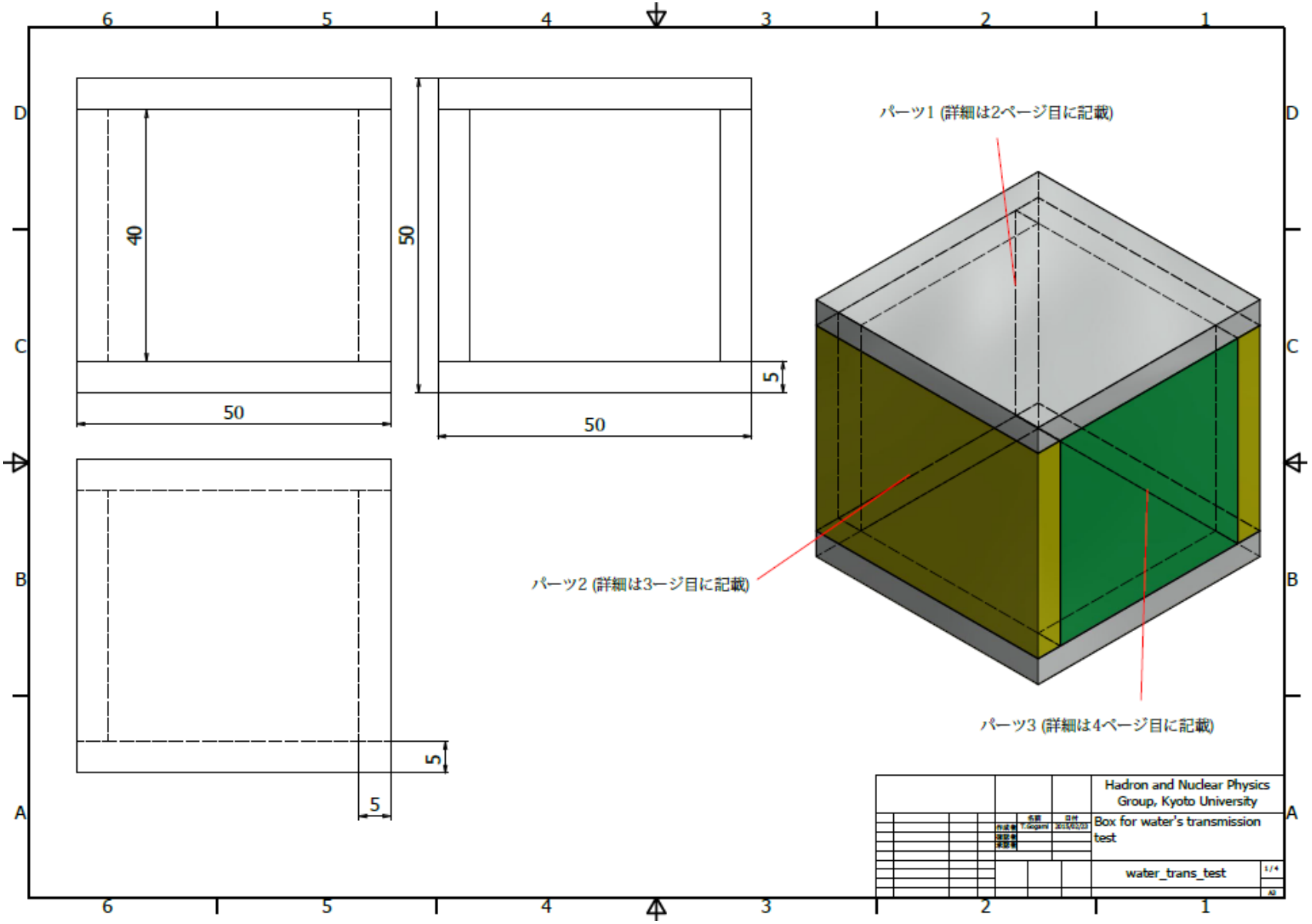



a = 8.5
b = 10429.0
c = 109261.0

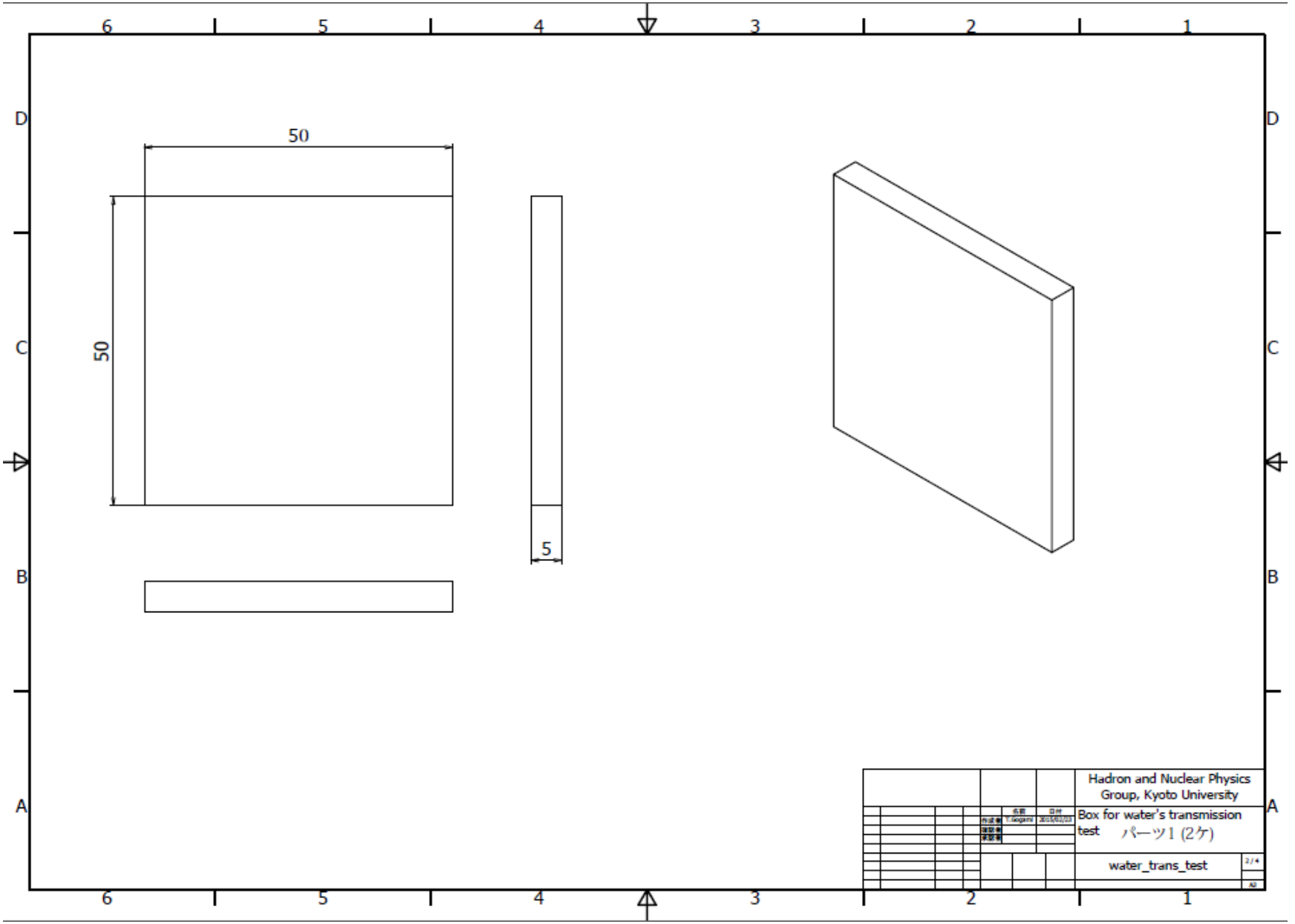



a = 0.7
b = 16073.4
c = 5202.96

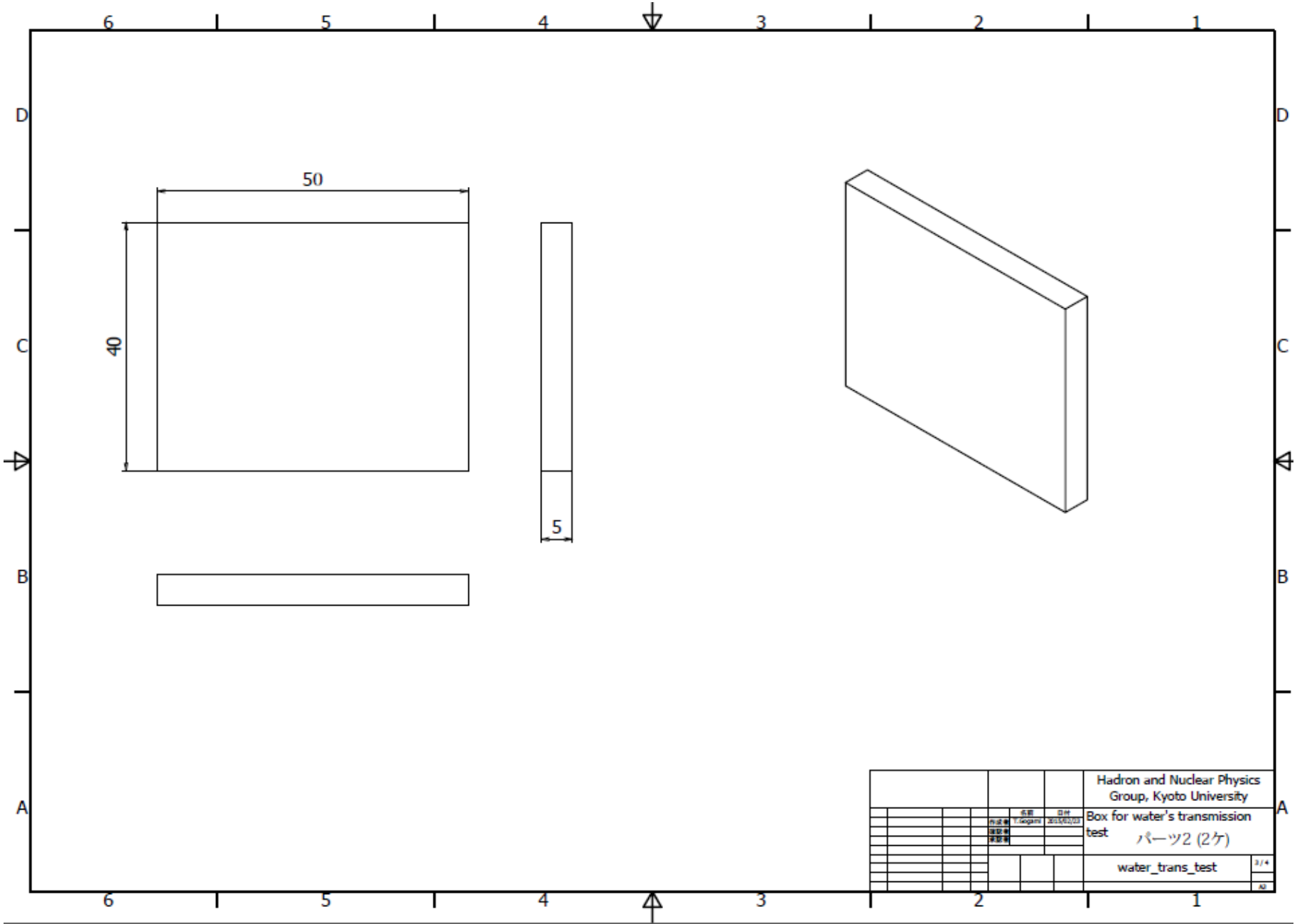
# Box for transmission measurement



# Box for transmission measurement



# Box for transmission measurement



# Box for transmission measurement