nnΛ analysis meeting (JLab E12-17-003)

Graduate School of Science, Kyoto University

Toshiyuki Gogami

April 14, 2021

京都大学　理学研究科・理学部
GRADUATE SCHOOL OF FACULTY OF SCIENCE
KYOTO UNIVERSITY

SPIRITS
SUPPORTING PROGRAM FOR INTERACTION-BASED INITIATIVE TEAM STUDIES

科研費
KAKENHI

$\Delta x'$ and $\Delta y' \rightarrow \Delta\theta$

Conversion equations that were **only** used for resolution estimation:

Kyoto:
https://wiki.jlab.org/tegwiki/images/4/4e/JLabMeeting_20210331_gogami_2.pdf

Hampton:
https://wiki.jlab.org/tegwiki/images/e/e4/Angle_conversion.pdf

```
// ==== The way of Kyoto ========== //
dxp1 = xpc/(1.0+xpc*xpc+ypc*ypc)/sqrt(xpc*xpc+ypc*ypc)*xpreso;
dyp1 = ypc/(1.0+xpc*xpc+ypc*ypc)/sqrt(xpc*xpc+ypc*ypc)*ypreso;

// ==== The way of Hampton ======== //
double temp = -ypc*sin(angc)+cos(angc);
double temp2= temp/sqrt(1.0+xpc*xpc+ypc*ypc);
double temp3= sin(angc)*(1.0+xpc*xpc) + ypc * cos(angc);
dxp2 = -1.0/sqrt(1.0-temp2*temp2) * temp  * (-1.0*xpc*pow(1.0+xpc*xpc+ypc*ypc,-3./2.));
dxp2 = dxp2 * xpreso;
dyp2 = -1.0/sqrt(1.0-temp2*temp2) * temp3 * (-1.0*pow(1.0+xpc*xpc+ypc*ypc,-3./2.));
dyp2 = dyp2 * ypreso;
```

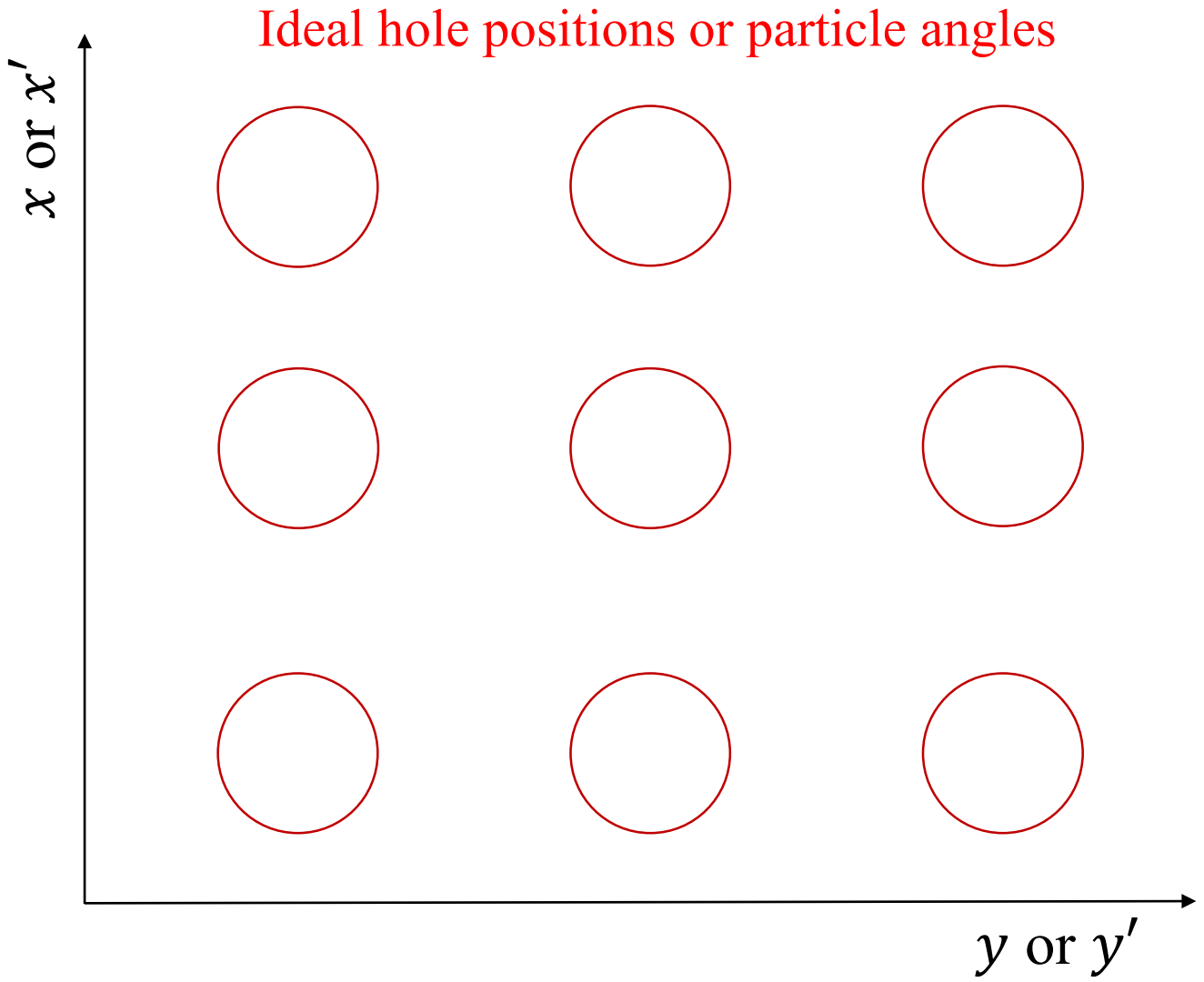
Hampton values

xpreso = 0.0025, ypreso = 0.0012:
- Way of Kyoto: 0.00113952
- Way of Hampton: 0.00113952

xpreso = 0.0011, ypreso = 0.0034:
- Way of Kyoto: 0.00322864
- Way of Hampton: 0.00322864

$\Delta\theta$ is exactly the same when the same assumption is used

Angle resolution estimation by SS data



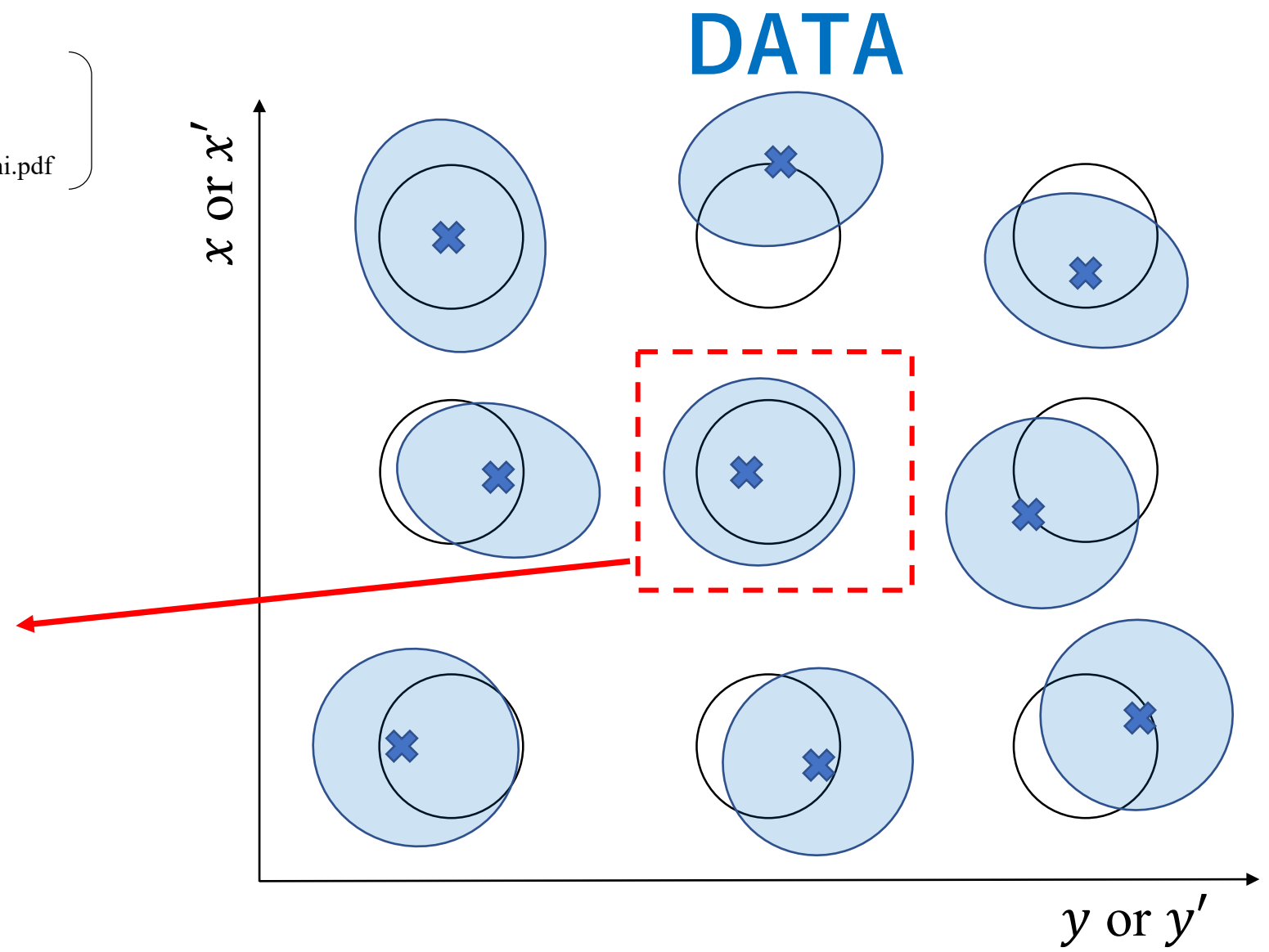
Angle resolution estimation by SS data

Reference:

https://www-nh.scphys.kyoto-u.ac.jp/~gogami/e12-17-003/meeting/analysis/src/nnL_AnalysisNote_20200501_gogami.pdf

Suzuki's estimation shown in the previous meeting:

- $\Delta x' = \Delta\left(\frac{p_x}{p_z}\right) = 2.2 \times 10^{-3}$
- $\Delta y' = \Delta\left(\frac{p_y}{p_z}\right) = 0.8 \times 10^{-3}$



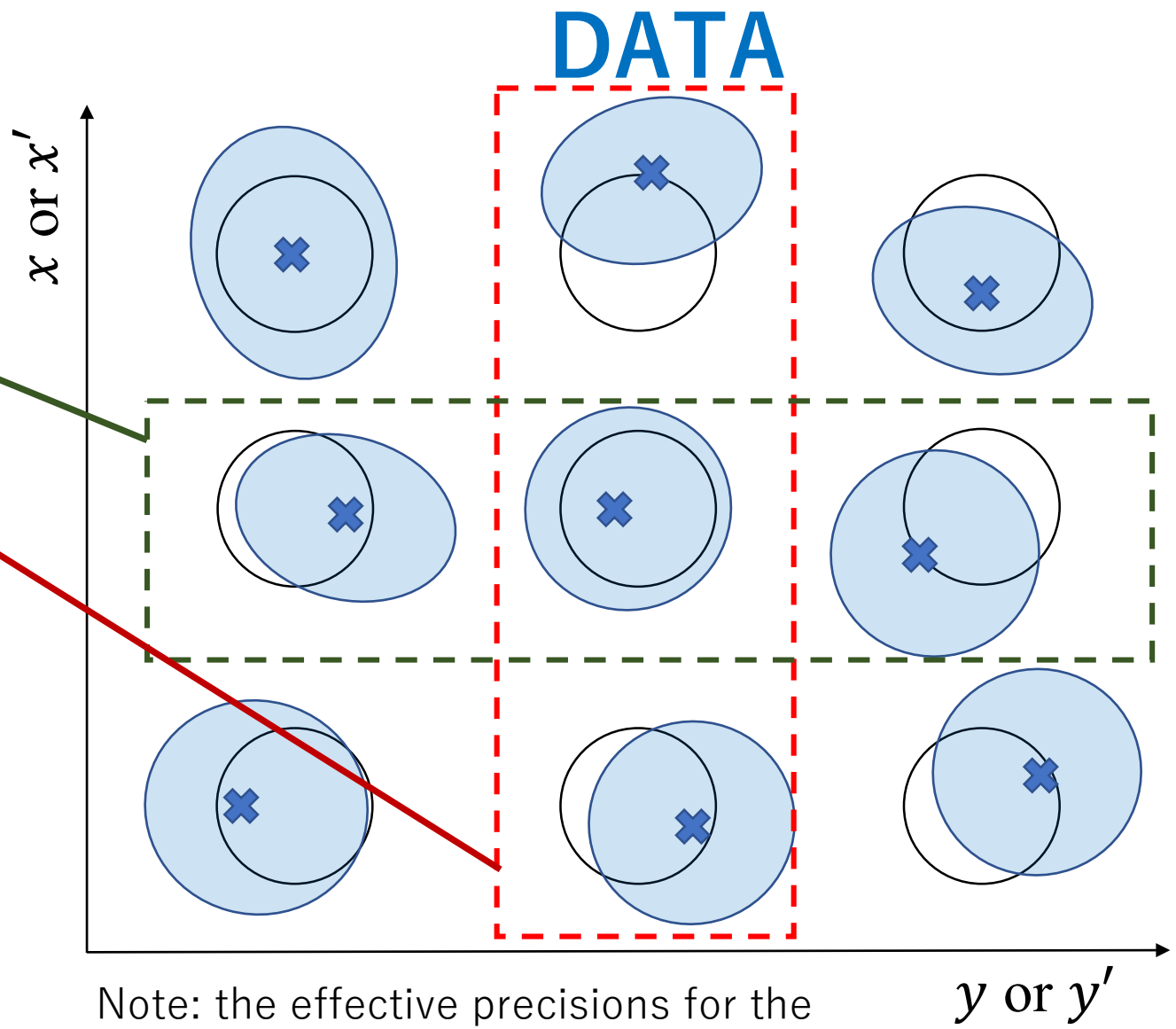
Angle resolution estimation by SS data

When all holes in each column or row were used for estimation:

- $\Delta x' = \Delta\left(\frac{p_x}{p_z}\right) = 2.37 \times 10^{-3}$
- $\Delta y' = \Delta\left(\frac{p_y}{p_z}\right) = 1.52 \times 10^{-3}$

"Effective precisions" that take "accuracies" into account in the acceptance

Effective precision: Suzuki's talk
Accuracy: Kosuke's talk



Note: the effective precisions for the multi-foil target case can be estimated.