

# Commissioning plan for IP-BSM

09/06/10

Masahiro Oroku

T.Yamanaka, Y.Yamaguchi, Y.Kamiya, S.Komamiya(Univ. of Tokyo)

T. Okugi, N. Terunuma, T. Tauchi, S. Araki,

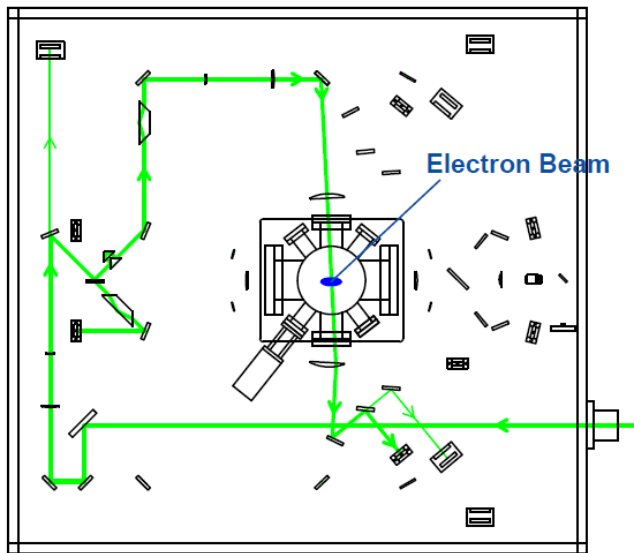
Y. Honda, T. Kume, J. Urakawa (KEK)

# Outline

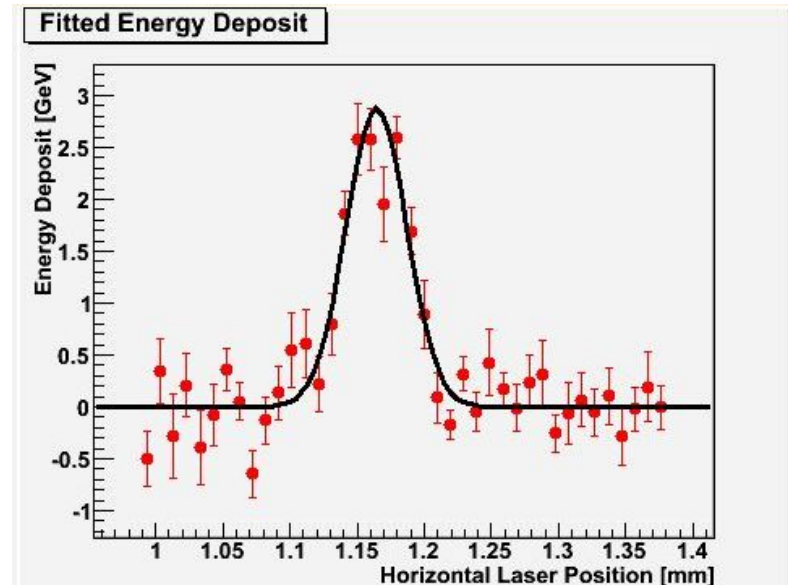
- Current status of IP-BSM
- Goals and what will be done during the next beam time series
- Tasks in summer shut down

# Achievement from Feb to May

- Compton signal was detected
- Horizontal beam size measurement and Q-scan were done by laser wire mode
- Vertical scan and interference mode have not been succeeded so far



laserwire mode optics  
(horizontal measurement)



Compton signal

# Goals of the next beam time series

- Beam size measurement by vertical and interference mode
- Measurement of under 100 nm beam  
(depend on the condition of the beam)

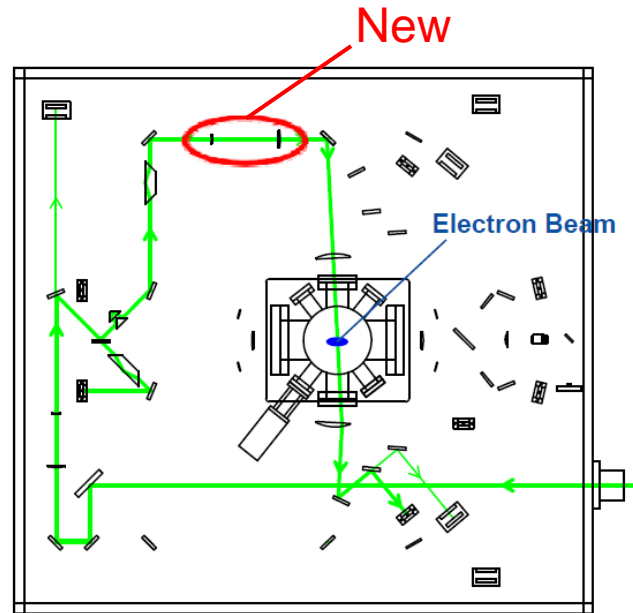
# What will be done during the next beam time series

- Check the system
  - By measuring the Compton signal using the laser wire mode
- After confirming the system
  - Laser wire mode
    - Laser wire mode with beam expander (better resolution expected)
    - Understand systematic error sources by comparing  
W wire scanner / knife edge measurement / different beam size
  - Laser fringe mode
    - Observe the signal from the one laser
    - Build up the procedure to make fringe target
    - Move the fringes (phase scan) and measure the signal modulation
    - Compare beam parameters with those from C wire scanner and different crossing angle mode (when the beam is in stable or reproducible condition)

# Tasks in Summer Shut Down

- **Horizontal measurement (laserwire mode)**
  - insert the beam expander into the laser line and focus the laser light to smaller size (5  $\mu\text{m}$  is aimed)
- **Vertical measurement**
  - install new screen monitor
- **Laser width measurement**
  - install knife edge target
- **Background reduction**
  - prepare smaller aperture collimator to enhance S/N ratio
  - perform collimator scan (instead of Polaroid)
  - insert intermediate collimator
  - replace the chamber in the final bending magnet
- **Gamma detector upgrade**
  - add gain monitor system
- **Another laser**
  - make transport line of the laser from EXT laserwire

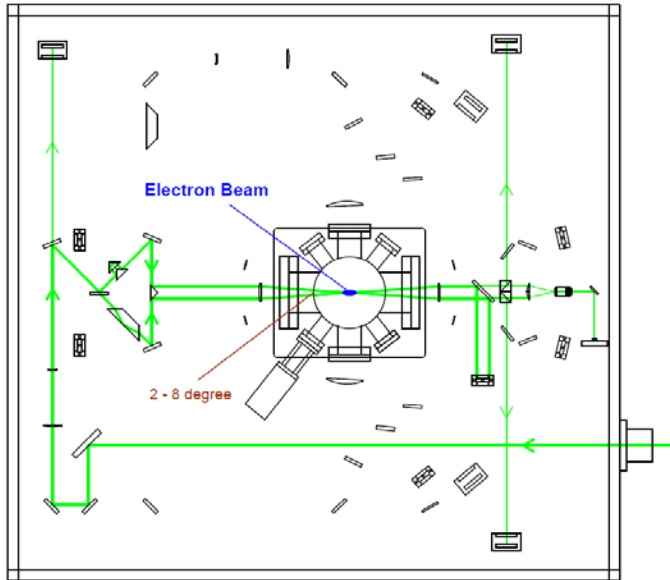
# Horizontal measurement



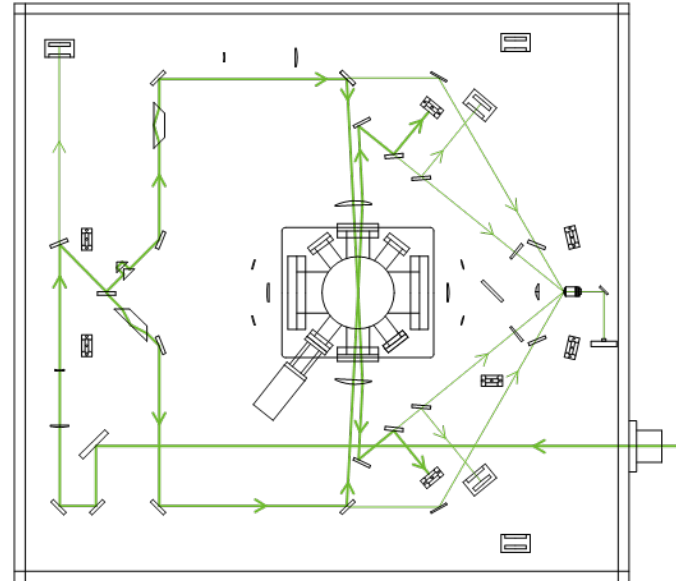
laserwire mode optics  
(horizontal measurement)

- Insert the beam expander into the laser line and focus the laser light to smaller size (5  $\mu\text{m}$  is aimed)

# Vertical measurement



2-8 degree mode



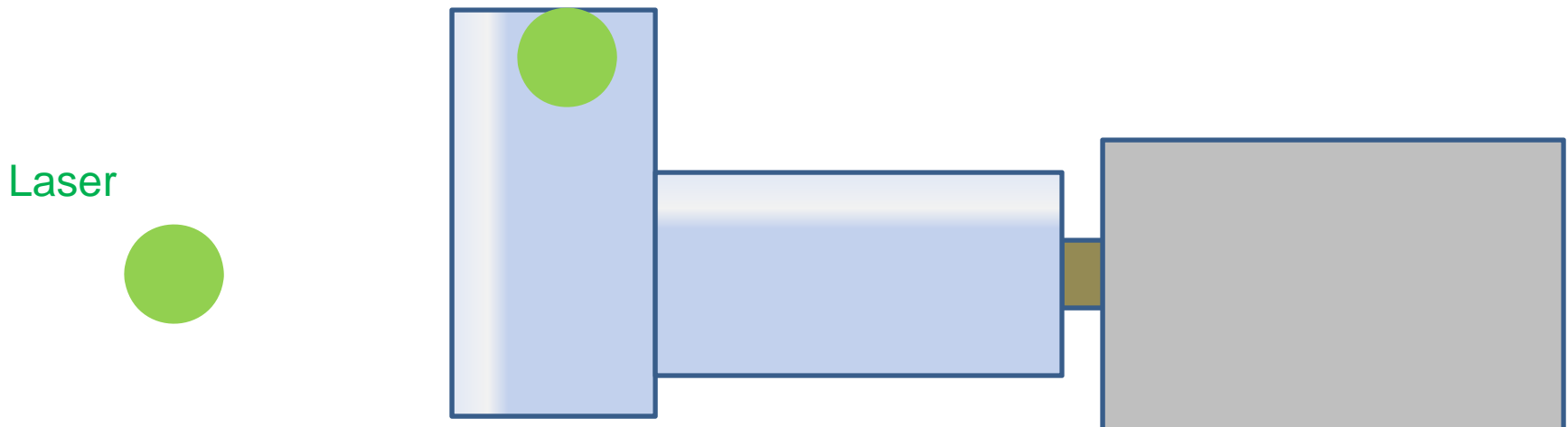
174 degree mode

- Install the new screen monitors for collision of beam and laser for each setups(2-8, 30 degree mode and 174 degree mode)



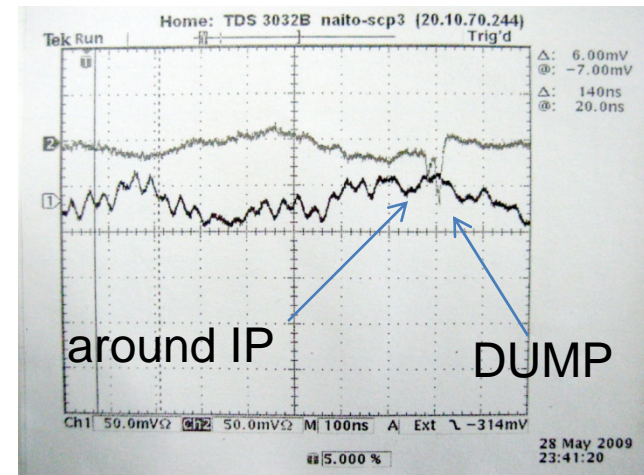
# Laser width measurement

- Install knife edge target to measure the laser size at IP
- Can be moved by stepping motor



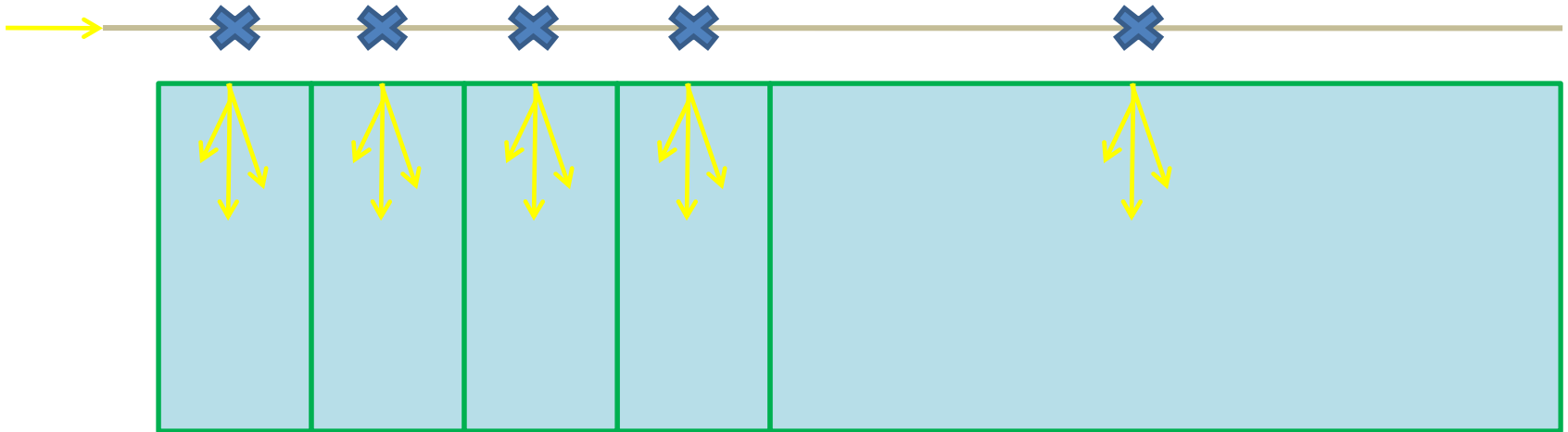
# Background reduction

- Collimator
  - prepare smaller aperture collimator to enhance S/N ratio
  - perform collimator scan (instead of Polaroid)
  - insert intermediate collimator
- Chamber
  - replace the chamber in the final bending magnet



Loss Monitor Signal

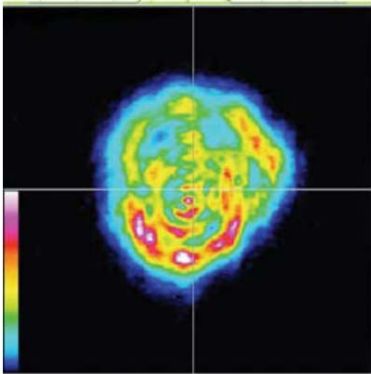
# Detector upgrade



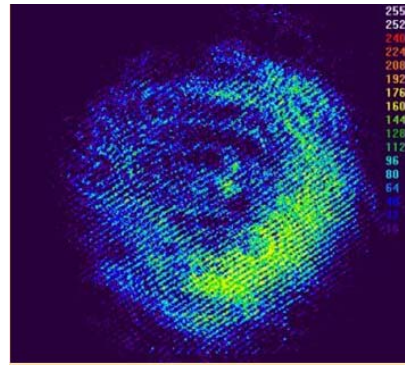
- Prepare the gain monitor  
⇒ To certify the efficiency of light correction is not changed(important for “fit” method)

# Another laser

- Make transport line of the laser from EXT laserwire
- Better laser profile
- Higher peak power  $\Rightarrow$  bigger signal expected



EXT laserwire



Shintake

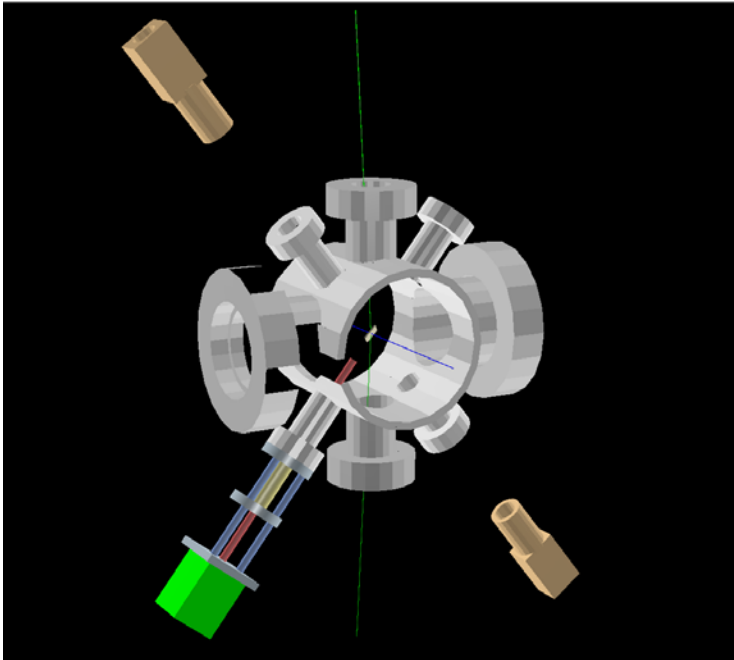
# Conclusion

- We could certify the condition for Compton scattering in the beam time from Feb. to May.
- Vertical scan and interference mode have not been succeeded so far.
- We will prepare and upgrade some devices (screen, detector...) and software.
- All optics mode (2-8 degree, 30 degree, and 174 degree) are going to be ready in autumn beam time.

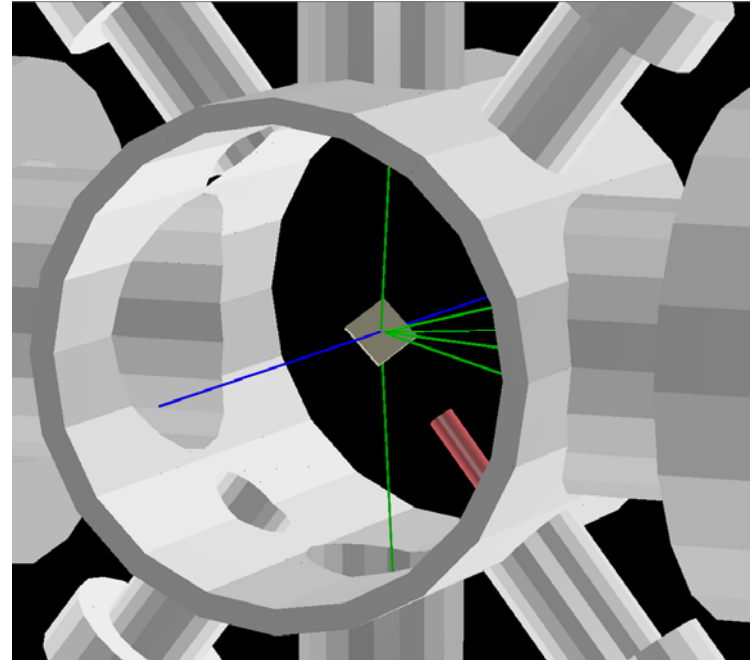
Back up

# New Screen monitor

- Install new screen monitor for collision of beam and laser



From downstream



From upstream

# Laser width measurement

- Install knife edge target to measure the laser size at IP
- Can be moved by stepping motor

