

## **Data Taking, Calibrations, Measurements** and Analysis with SK I - VII

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\*Presenter: Luis Labarga (UAM)

Participating researchers: Luis Labarga (UAM), Pablo Fernández (DIPC), Bryan Zaldivar (UAM), Dustin Samudio (UAM)

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**Research Result Presentation Meeting of the ICRR Inter-University Research Program FY2024** 

2024i-A-003







UAM has been granted with ICRR-IURP projects since 2019:

- ◆ A05, A03: for UAM works on Super-Kamiokande I VIII
- + B01, B03: for UAM contributions to the construction of the Hyper-Kamiokande experiment

## **Calibration and** related works

Results

- See more details in LL presentation • 2024i-B-002 [by Luis Labarga]
- NiCf event generation with SKG4:

Comparisons of: vertex reconstruction, N50, BsEnergy for SKV, SKVI and SKVII.





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### Vertex X Distribution



### reconstructed X-vertex consistent with nominal X-vertex resolution slightly better at SK-V

### [by Dustin Samudio]





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|                  | 1 O  |  |  | daily check   | onsite experts   | Note  |  |  |    |  |
|                  | 2  | 2025/1/1   | Wednesday  | Nataly        | Moriyama   | OK but access v   | olation. Killed by t   | task manager   |    |  |
|                  | 3  | 2025/1/2   | Thursday   |               | Moriyama   | OK but access v   | iolation. Killed by  | task manager   |    |  |
|                  | 4  | 2025/1/3   | Friday   |               | Moriyama   | OK; but abnormal program termination  |  |  |    |  |
|                  | 5  | 2025/1/4   | Saturday   |               | Moriyama   | Just top and a ni   | uge value. Error in  | laser.   |    |  |
|                  | 7  | 2025/1/5   | Sunday   | Maningana     | Moriyama   | No data; rainbow  | was frozen. Kille  | d by task man  |    |  |
|                  | ~  | 2025/1/0   | Monday   | wonyama       | Kai  | OK; Al 0:04, con  | armed it started to  | o run but it see   |    |  |
|                  | 9  | 2025/1/7   | Wednesday  |               | Kai  | OK: Center at 0   | am   |  |    |  |
|                  | 10   | 2025/1/0   | Thursday   |               | Kai  | OK: At 1 nm still   | am.<br>I ton. The laser on   | ot does not sh   |    |  |
|                  | 11   | 2025/1/9   | Friday   |               | Kai  | no data because   | the day for the la   | st day finisher  |    |  |
|                  |  | 2023/1/10  | Пар  |               | Kai  | OK: Center at 11  | and day for the la   | at day minariet  |    |  |
|                  | 12   | 2025/1/11  | Saturday   |               |  | on, contor at H   | G.11.  |  |    |  |
|                  | 12<br>13   | 2025/1/11  | Saturday<br>Sunday   |               | Kai  | OK: Bottom at 2   | pm. No impact by   | the power out  |    |  |
|                  | 12<br>13<br>14   | 2025/1/11<br>2025/1/12<br>2025/1/13  | Saturday<br>Sunday<br>Monday   | Natalv        | Kai<br>Moriyama  | OK; Bottom at 2<br>OK   | pm. No impact by   | the power out  |    |  |
|                  | 12<br>13<br>14<br>15   | 2025/1/11<br>2025/1/12<br>2025/1/13<br>2025/1/14   | Saturday<br>Sunday<br>Monday<br>Tuesday  | Nataly        | Kai<br>Moriyama<br>Moriyama  | OK; Bottom at 2<br>OK<br>OK   | pm. No impact by   | the power out  |    |  |
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|                  | 12<br>13<br>14<br>15<br>16<br>17                               | 2025/1/11<br>2025/1/12<br>2025/1/13<br>2025/1/14<br>2025/1/15<br>2025/1/16   | Saturday<br>Sunday<br>Monday<br>Tuesday<br>Wednesday<br>Thursday   | Nataly        | Kai<br>Moriyama<br>Moriyama<br>Moriyama<br>Moriyama  | OK; Bottom at 2<br>OK<br>OK<br>OK; but abnorma<br>top and center. C   | pm. No impact by<br>al program termina<br>Computer automat   | the power out<br>ation. Killed by<br>ically restarted  |    |  |
|                  | 12<br>13<br>14<br>15<br>16<br>17<br>18                         | 2025/1/11<br>2025/1/12<br>2025/1/13<br>2025/1/14<br>2025/1/15<br>2025/1/16<br>2025/1/17  | Saturday<br>Sunday<br>Monday<br>Tuesday<br>Wednesday<br>Thursday<br>Friday   | Nataly        | Kai<br>Moriyama<br>Moriyama<br>Moriyama<br>Moriyama  | OK; Bottom at 2<br>OK<br>OK<br>OK; but abnorma<br>top and center. C<br>OK   | pm. No impact by<br>al program termina<br>Computer automat   | the power oul<br>ation. Killed by<br>ically restarted  |    |  |
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|                  | 12   13   14   15   16   17   18   19   20   21   22           | 2025/1/11<br>2025/1/12<br>2025/1/13<br>2025/1/14<br>2025/1/15<br>2025/1/16<br>2025/1/17<br>2025/1/18<br>2025/1/19<br>2025/1/20<br>2025/1/21              | Saturday<br>Sunday<br>Monday<br>Tuesday<br>Wednesday<br>Thursday<br>Friday<br>Saturday<br>Sunday<br>Monday<br>Tuesday                        | Kai           | Kai<br>Moriyama<br>Moriyama<br>Moriyama<br>Moriyama<br>Moriyama<br>Moriyama<br>Kai<br>Kai        | OK; Bottom at 2<br>OK<br>OK<br>OK; but abnorma<br>top and center. O<br>OK<br>OK; but access<br>OK; but access<br>Was ready to run<br>OK                       | pm. No impact by<br>al program termina<br>Computer automat<br>violation. Killed by<br>violation. Killed by<br>before midnight,             | the power out<br>ation. Killed by<br>ically restarted<br>task manager<br>task manager<br>no data but a t |    |  |
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[by Nataly Ospina]



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**Physics Analysis** 

Results

- Comparison NEUT 5.4.0.1 vs NEUT 5.6.4 for SKVI *[by Nataly*] Ospina]
- Comparison NEUT 5.4.0.1 vs NEUT 5.6.4 for SKVII *[by Dustin*] Samudio]
- NCQE for SKVI reprocessed data [by Nataly Ospina]





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| Interaction        | Phase    | Events      | Fraction            | Fraction Discrepancy |  |
|--------------------|----------|-------------|---------------------|----------------------|--|
| all                | SK-VI    | 4671565     | $1.0000 \pm 0.0007$ | ٥                    |  |
|                    | SK-VII   | 3393588     | $1.0000 \pm 0.0008$ | U                    |  |
| ccqelike           | SK-VI    | 1808764     | $0.3872 \pm 0.0003$ | 6 29                 |  |
|                    | SK-VII   | 1298998     | $0.3828 \pm 0.0004$ | 0.28                 |  |
| cc1pi              | SK-VI    | 881391      | $0.1887 \pm 0.0002$ | 26                   |  |
|                    | SK-VII   | 644719      | $0.1900 \pm 0.0003$ | 2.0                  |  |
| ccother            | SK-VI    | 648230      | $0.1388 \pm 0.0002$ | 3 75                 |  |
|                    | SK-VII   | 475384      | $0.1401 \pm 0.0002$ | 5.25                 |  |
| nunaga             | SK-VI    | 539021      | $0.1154 \pm 0.0002$ | 15                   |  |
| nuncqe             | SK-VII   | 393595      | $0.1160 \pm 0.0002$ | 1.5                  |  |
| nubnaca            | SK-VI    | 236743      | $0.0507 \pm 0.0001$ | 15                   |  |
| nublicqe           | SK-VII   | 172924      | $0.0510 \pm 0.0001$ | 1.5                  |  |
| nalni              | SK-VI    | 322004      | $0.0689 \pm 0.0001$ | 2                    |  |
| пстрі              | SK-VII   | 235182      | $0.0693 \pm 0.0001$ | 2                    |  |
| noothar            | SK-VI    | 235412      | $0.0504 \pm 0.0001$ | 25                   |  |
| ncotner            | SK-VII   | 172786      | $0.0509 \pm 0.0001$ | 2.3                  |  |
| Ratio<br>SK-VI/VII | Normaliz | ed to SK-VI | $1.0071 \pm 0.0007$ |                      |  |

E<sub>vis</sub> [MeV]

# Activities

## Budget: 290,000 JPY => spent on travel and accommodation at the Kamioka Observatory and the ICRR (Kashiwanoha Campus).

- \* [77,800 JPY] Kamioka Observatory: SK training and SK data taking
- \* [57,750 JPY] Kamioka Observatory: SK coil repair works
- \* [73,500 JPY] Kamioka Observatory: NCQE analysis and UDEAL maintenance
- \* [80,950 JPY] ICRR (Kashiwa): NEUT analysis





