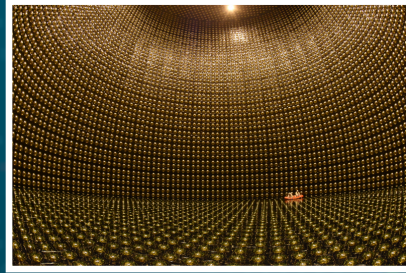


Seasonal Variation of Solar Neutrino Flux at Super-Kamiokande

vPHYS 2019 - POSTER SESSION

Super-KamiokaNDE

- Neutrino observatory and water Cherenkov detector situated in the Kamioka area of Hida, Japan.
- International collaboration of ~ 150 people from 40 institutions in 10 countries.

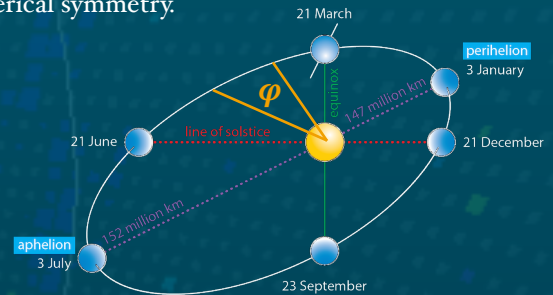


Specifications

- Tank made of stainless steel
- ~ 50,000 tons of ultra-pure water
- ~ 13,000 Photo-Multiplier Tubes

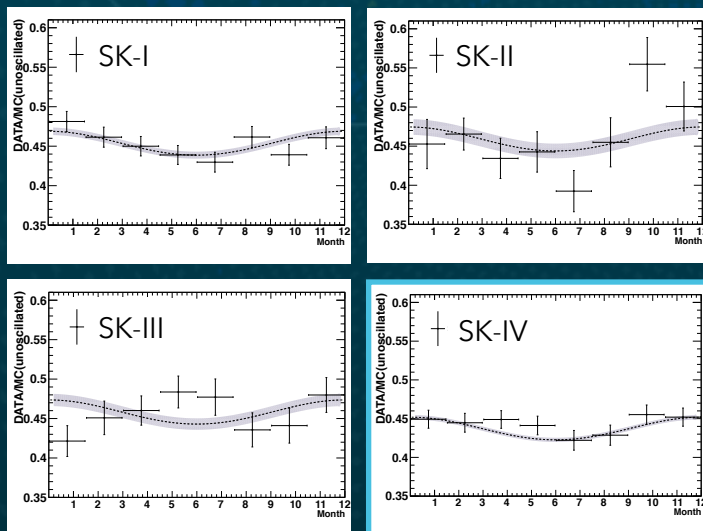
Seasonal Variation

The flux of **solar neutrinos** detectable on Earth would be expected to fall proportionally to $1/r^2$, due to spherical symmetry.



Since the distance r from the Earth to the Sun changes as a yearly cycle due to the orbital trajectory, it follows that there will be a **seasonal variation** in the flux.

Previous Method

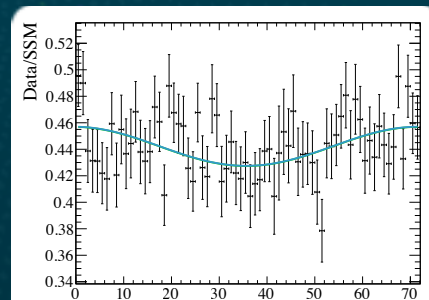


- SK-I: 1996 - 2001 & SK-II: 2002 - 2005 → Variation consistent
- SK-III: 2006 - 2008 & SK-IV: 2008 - 2018 → Variation out of phase

New Method

Uses astronomical distribution rather than analysing by date (72 azimuthal bins).

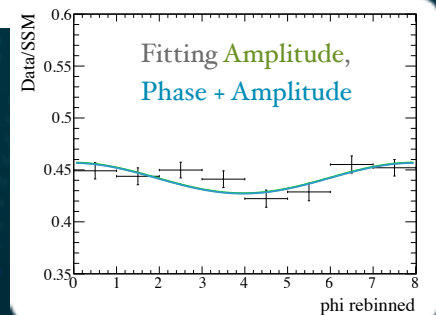
E range = 4.5 - 20 MeV
Zenith angle = all



Oct 2008

↓

May 2018



Conclusions

- The two methods now verify each other and function as a cross-check.
- SK-III reanalysis in progress.
- Possible applications to future direct dark matter experiments.

REFERENCES

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