Far/Near ratio 2

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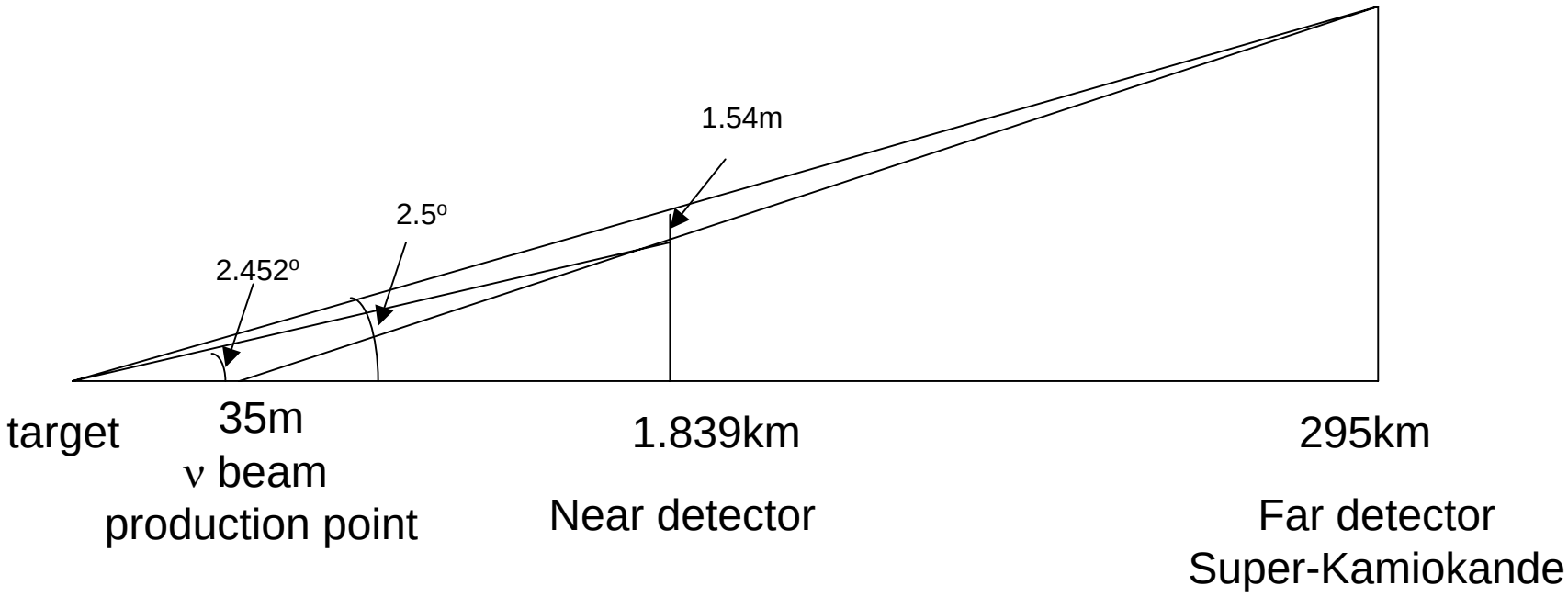
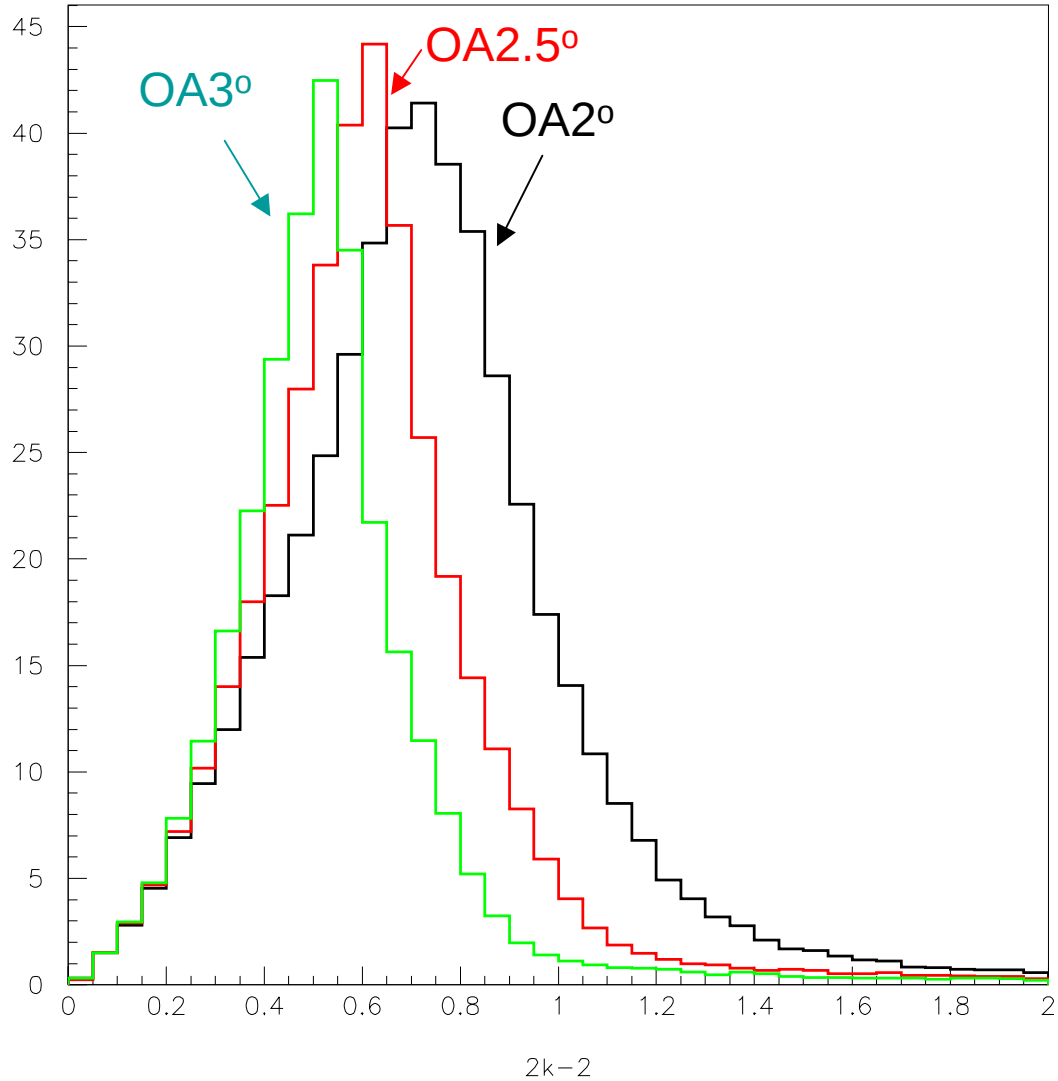
Neutrino beam production position

Neutrinos are generated in the decay volume, not at target position. This difference is negligible from SK, but should be taken into account from ND.
ND should be put on the line from ν beam production point to SK.

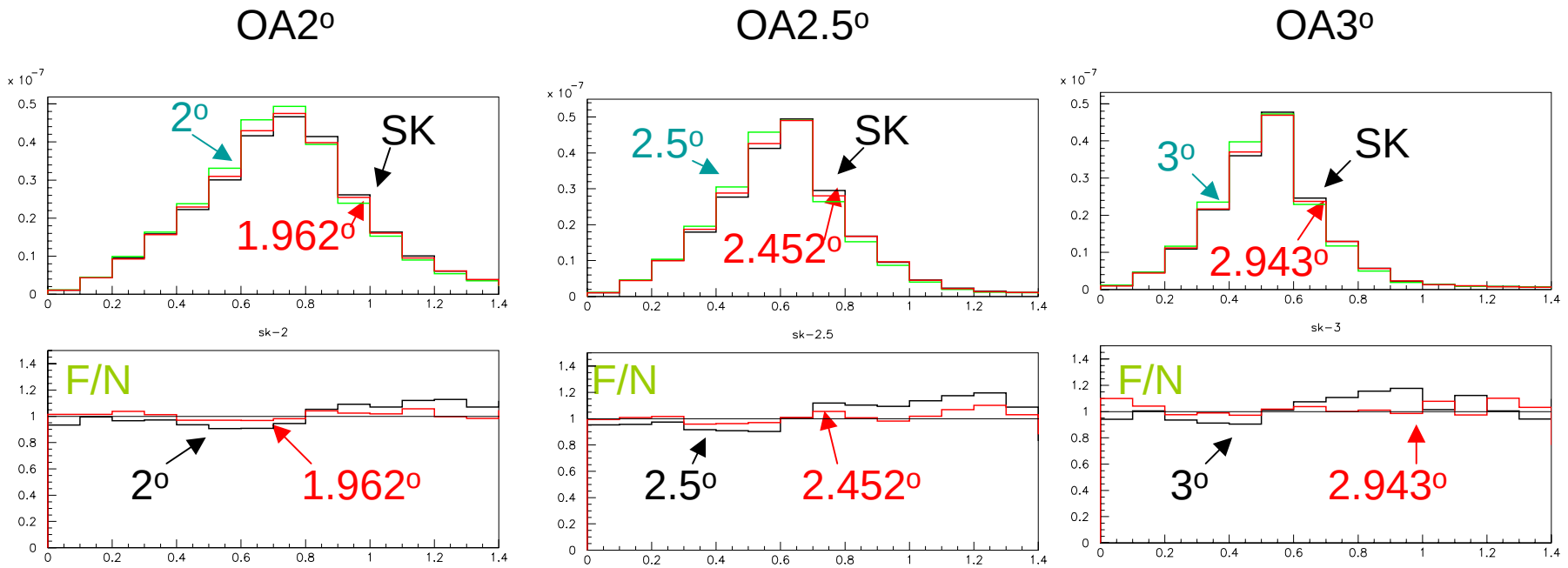


neutrino energy spectrum (OA2º, OA2.5º and OA3º)



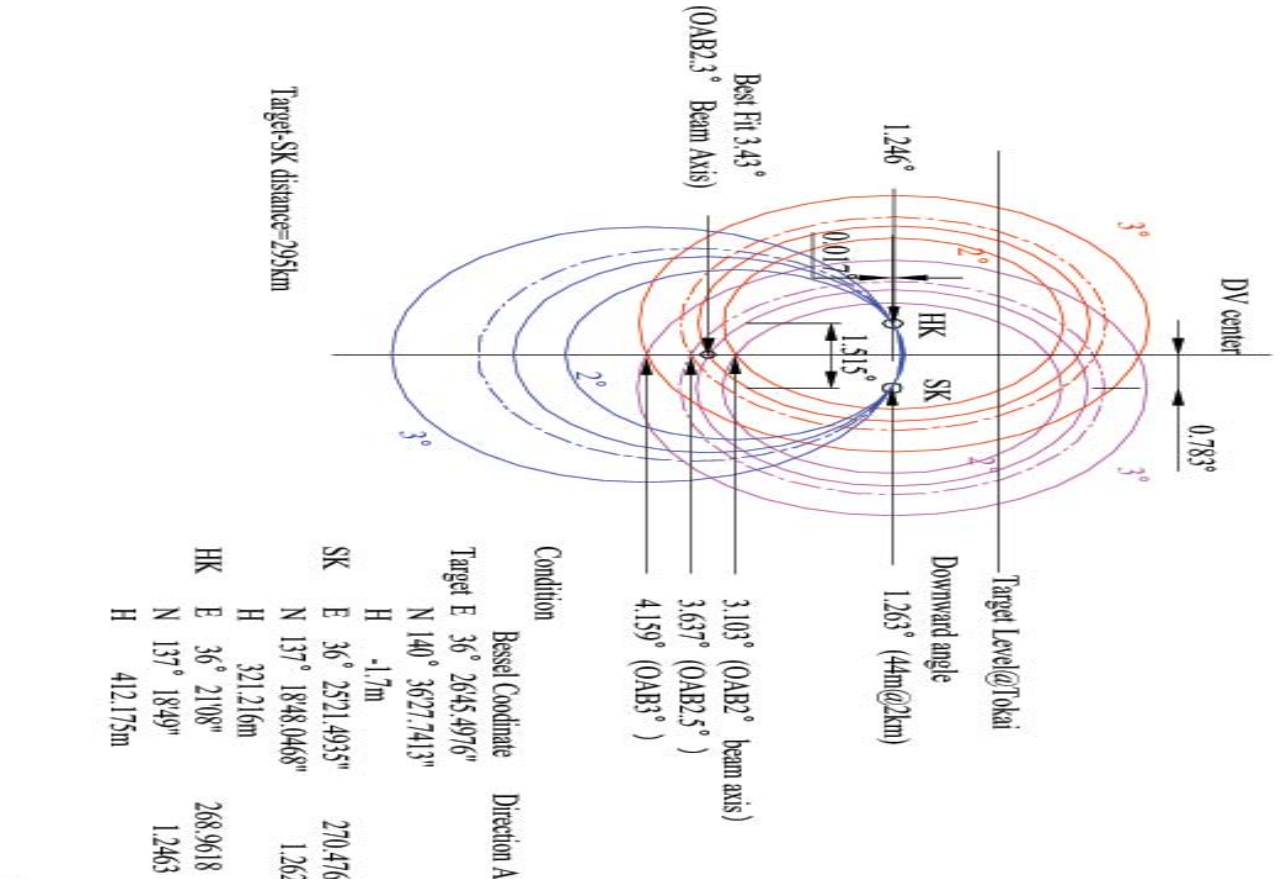
Far/Near ratio for OA2º, OA2.5º and OA3º are checked.

neutrino energy spectrum and Far/Near ratio (OA2º, OA2.5º and OA3º)



Far/Near ratio is improved by taking into account the ν beam production point.

Position of 2km Near detector

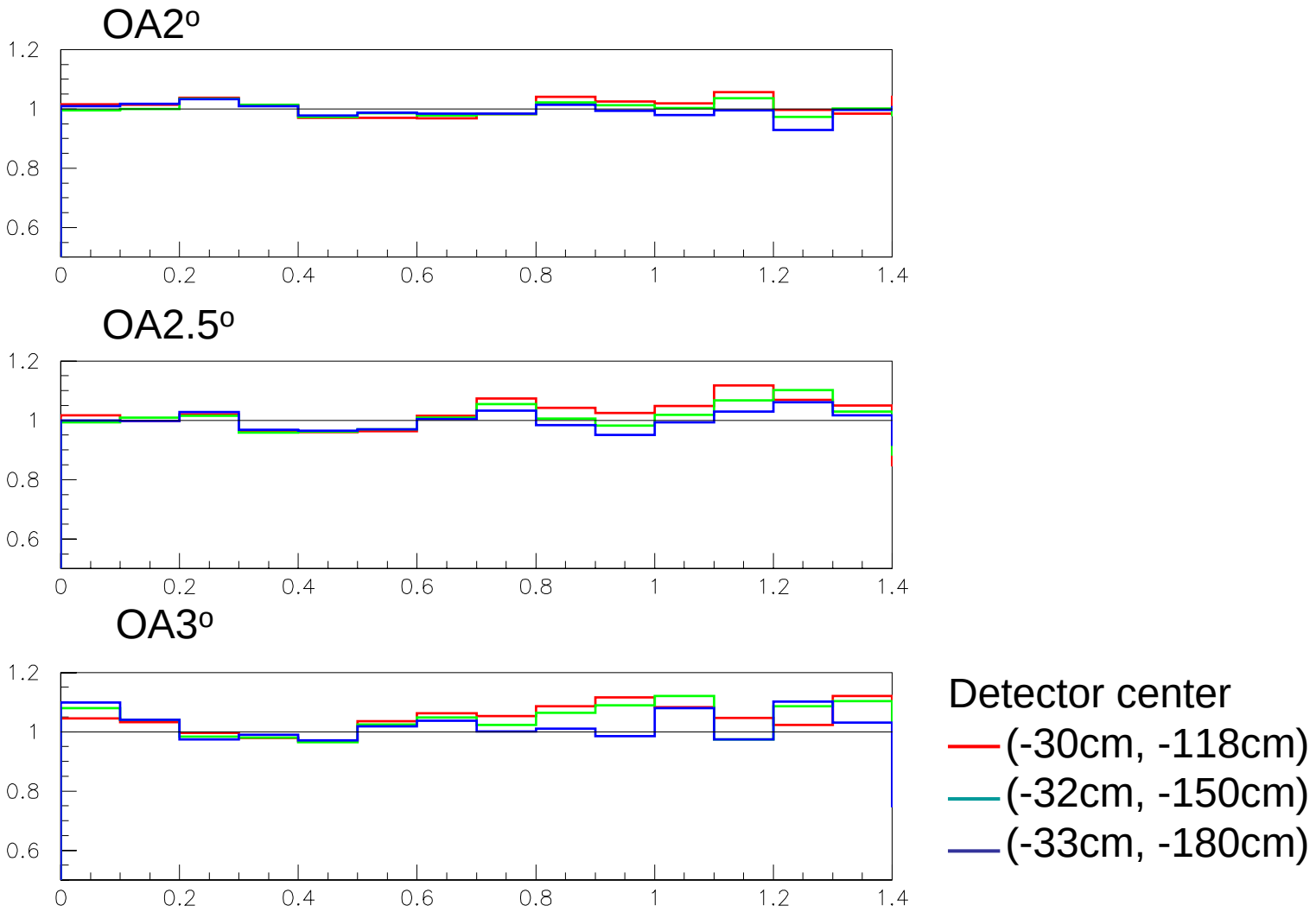


If we assume the neutrino production point is 35m downstream from the neutrino target, the position of near detector should be

	Δpos	north	down
OA2^o	1.22m	= (0.30m,	1.18m)
OA2.5^o	1.54m	= (0.32m,	1.50m)
OA3^o	1.83m	= (0.33m,	1.80m)

However, we have to select one position.

Far/Near ratio for each set up



Difference of Far/Near ratio for each position is small.

Conclusion

- Far/Near ratio is improved by taking into account the neutrino production position for OA2^{o}, OA2.5^{o} and OA3^{o}.
- If we assumed the neutrino production position was 35m downstream from the target, the difference of optimized 2km ND position for OA2^{o}, OA2.5^{o} and OA3^{o} was less than 1m.
- The difference of Far/Near ratio for each 2km ND position is small.
- Different hadron production models should be checked.