

## Matter Density Profile Effects On Neutrino Oscillations At T2HK And T2HKK

NEXT WORKSHOP 2019 Susana Molina Sedgwick

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### HYPER-KAMIOKANDE



### NEXT WORKSHOP



- Iox larger than Super-K
- Upgraded near + intermediate detector
- Multipurpose: huge research potential



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### NEXT WORKSHOP





#### Sensitivity estimate

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#### Sensitivity estimate



#### Parameter variation

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#### Sensitivity estimate



Density profile variation



#### Parameter variation

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#### Sensitivity estimate



Density profile variation



#### Parameter variation



But the interesting results are for Hyper-K Korea!





HYPER-K KOREA



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HYPER-K KOREA

5 baselines - 1000 km 1050 km 1100 km 1150 km 1200 km



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### HYPER-K KOREA











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#### Sensitivity estimate



#### Parameter variation

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#### Sensitivity estimate



Density profile variation



#### Parameter variation

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**HKK** 

2.0

 $\theta_{13}$ 

1.5

δ<sub>CP</sub>



#### Sensitivity estimate



10<sup>-6</sup> 0.5 1.0  $E_V$ [GeV] Parameter variation

0.100

0.010

0.001

 $10^{-4}$ 

10<sup>-5</sup>

 $|\Delta P_{\mu e}|$ 



Density profile variation

Profile differences









Southampt

DN



 $\Rightarrow$  Significant differences between matter effects in T<sub>2</sub>HK and T<sub>2</sub>HKK.

⇒ A varying matter density profile at T2HKK could give rise to detectable matter effects.

Southamp

**D**N



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Profile effects on most probable T2HKK baseline.



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### THANK YOU!