

# **Study of Fuel Evolution and Isotope Contribution Decomposition at Daya Bay**



*Wei Wang (on behalf of the Daya Bay Collaboration)*

*Sun Yat-sen University*

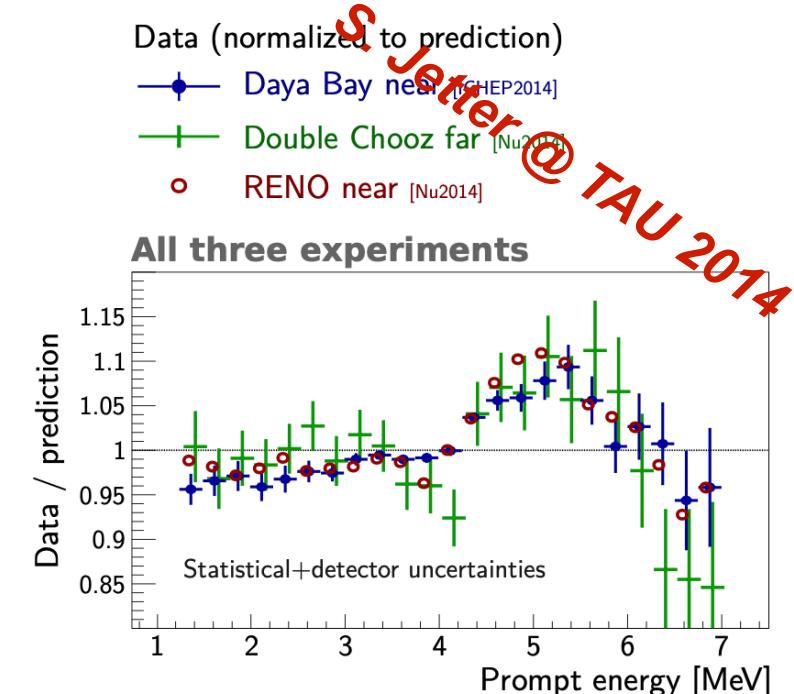
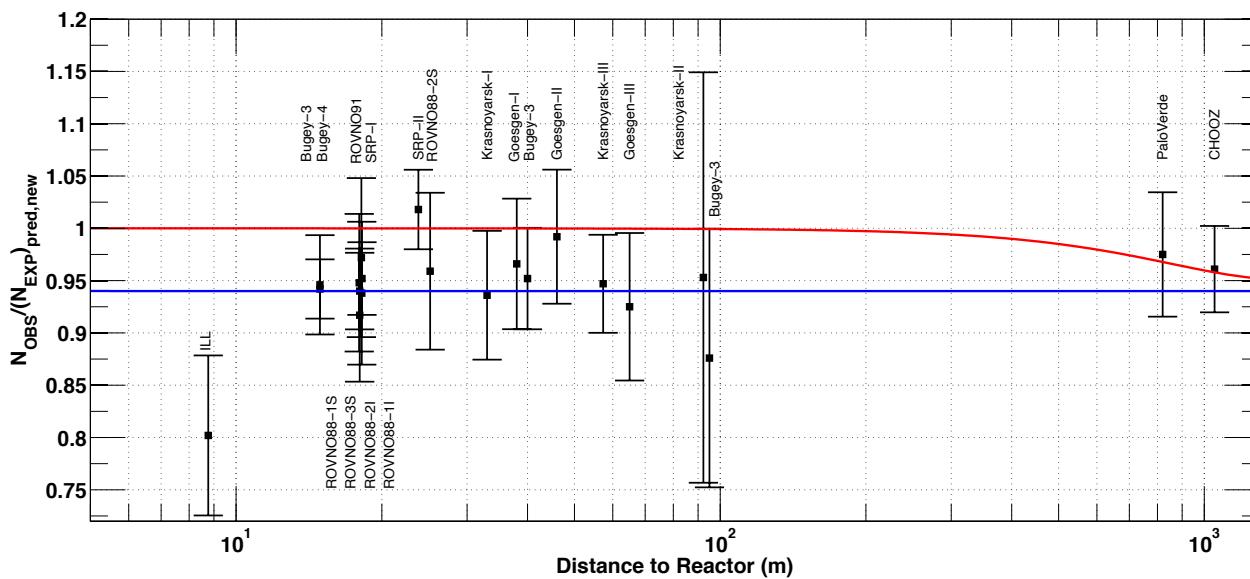
*ICHEP 2020, Prague, Czech*

- Reactor antineutrino anomaly and its spectrum discrepancy
- Reactor fuel evolution analysis and IBD yield measurements
- Flux and spectral decomposition analyses

# Reactor Antineutrino Anomaly and the Spectrum Discrepancy



- Reactor Antineutrino Anomaly (RAA) has been haunting the community since 2011
- So has been the reactor antineutrino spectrum discrepancy since 2014.

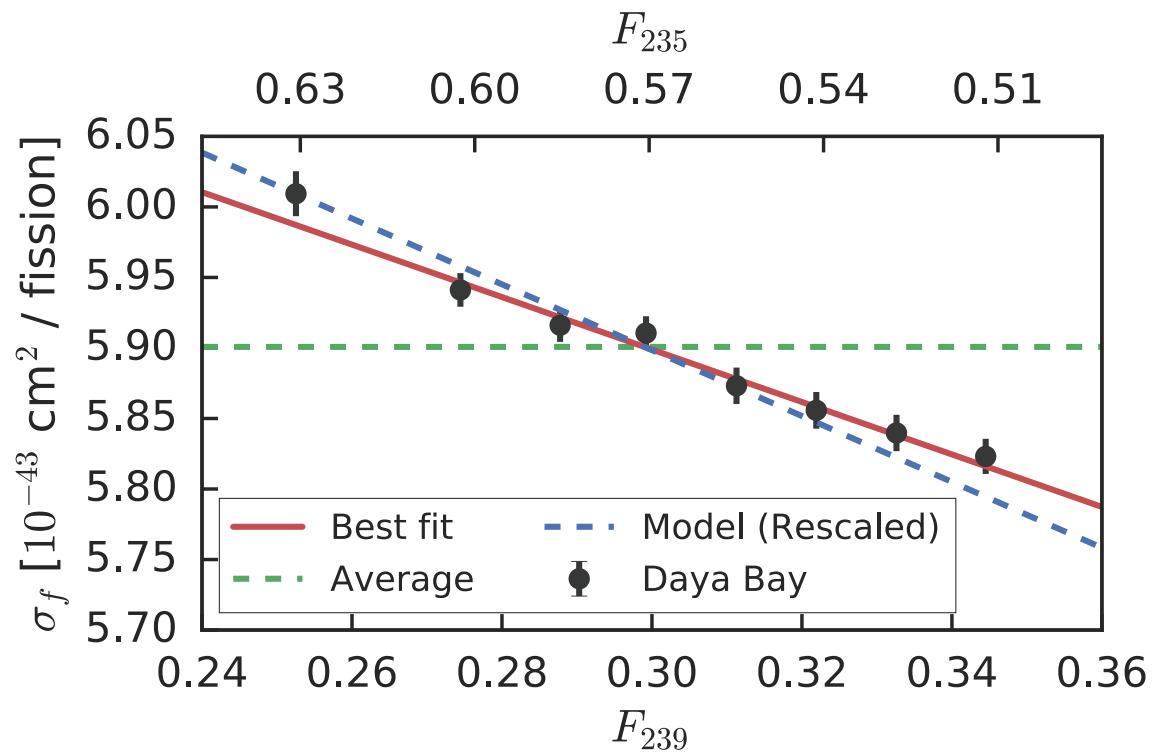
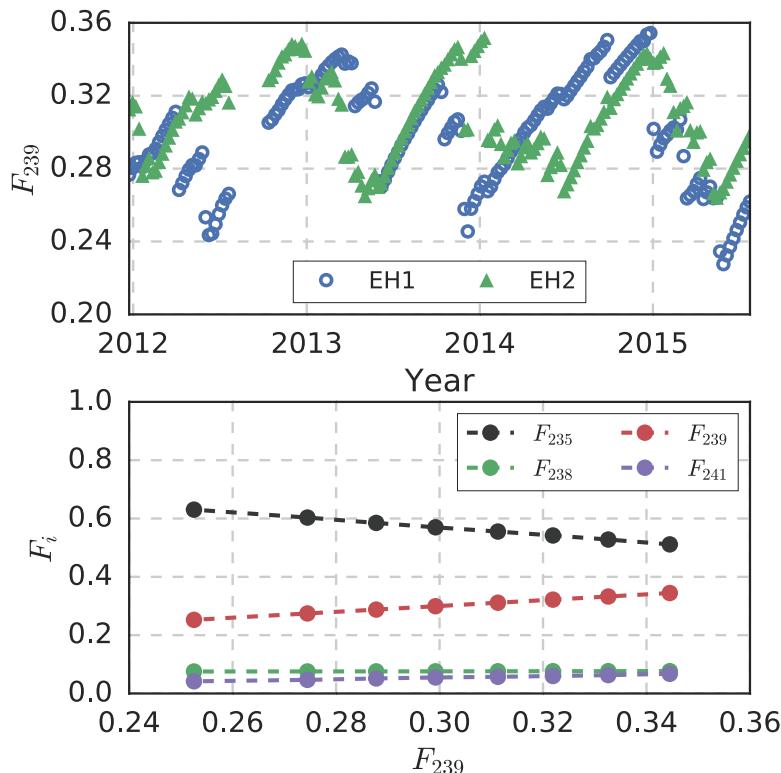


- Revaluation of ILL beta spectra data
- Combined with *ab initio* approach
- ~6% deficit

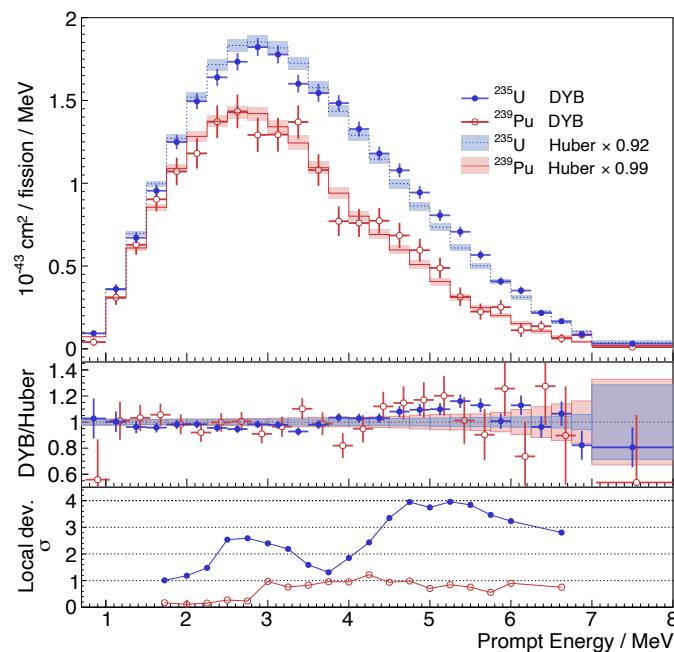
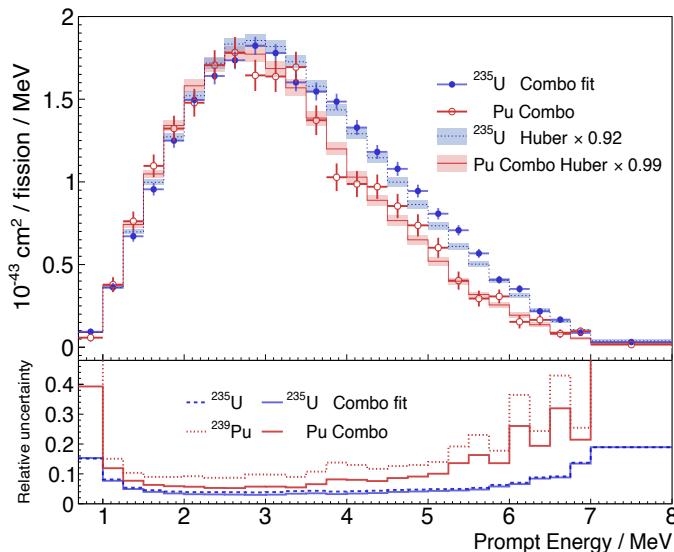
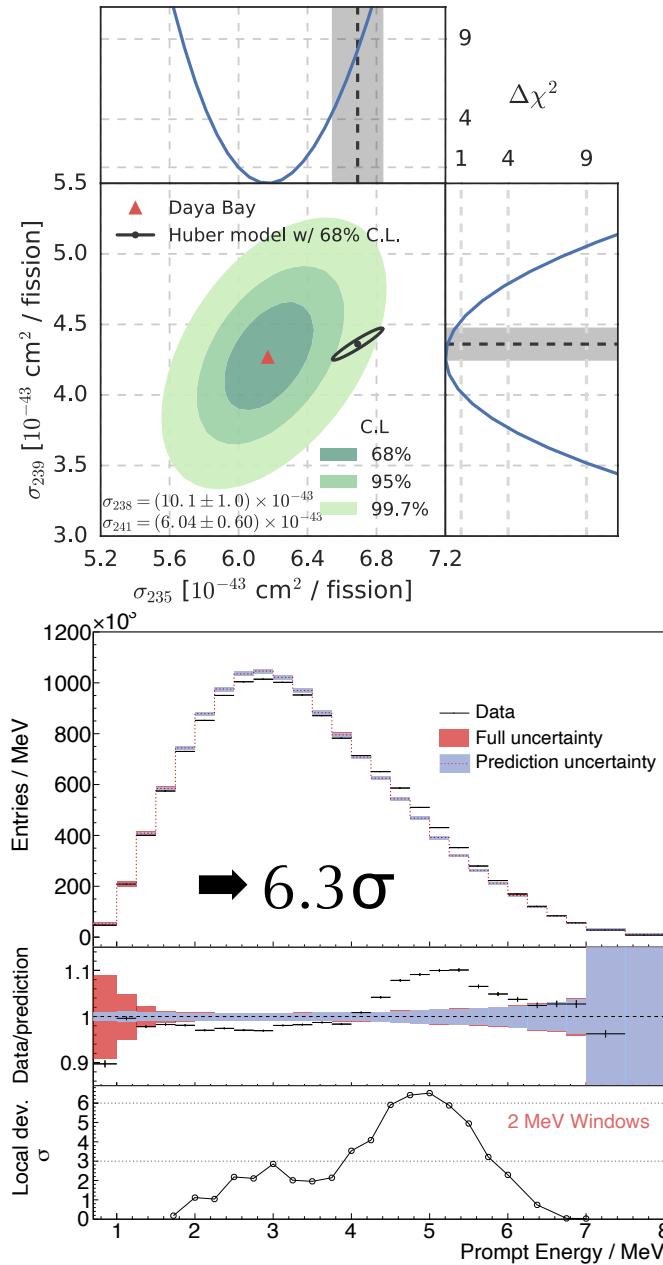
# Daya Bay RAA Results and Correlation with Isotopes



- An effective fission fractions can be evaluated based on the data passed from the power plant
- IBD yields can be evaluated or measured using the Huber-Mueller model or the Daya Bay data



# Decomposing Fission Isotope Contributions



- With 1230 days of data, a correlation analysis shows that  $^{235}\text{U}$  is more likely to be responsible RAA
- A spectral decomposition is carried out for the first time
- Spectral decomposition also shows that  $^{235}\text{U}$  is responsible for the “bump”,  $4\sigma$ ; while  $^{239}\text{Pu}$  is consistent within  $1.2\sigma$