

Finite Volume Hamiltonian method : connecting EFT and lattice study

Kang Yu

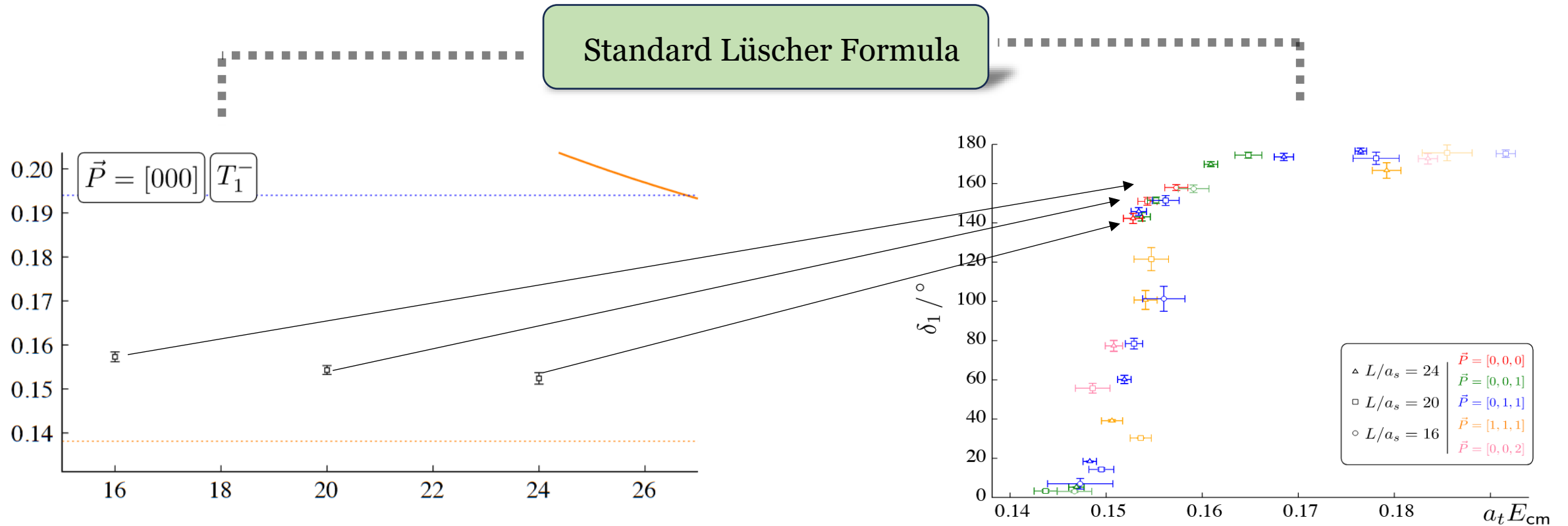
Collaborators: Jia-Jun Wu, Guang-Juan Wang, Zhi Yang

based on JHEP04(2025)108

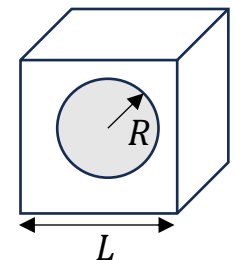


中国科学院大学
University of Chinese Academy of Sciences

From lattice spectra to scattering amplitude

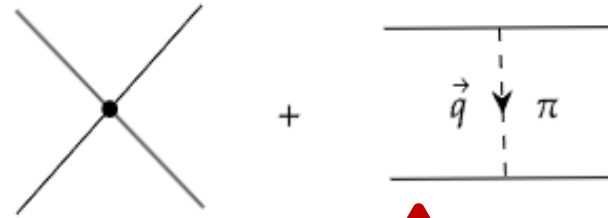
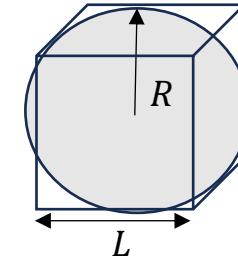


a **model-independent** relationship if potential is **SHORT-RANGED**



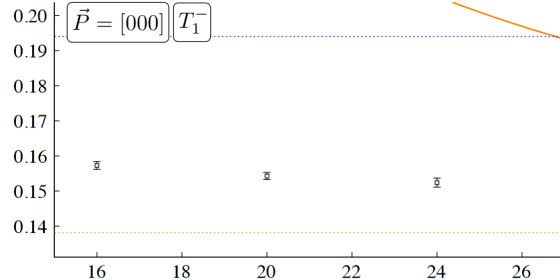
From lattice spectra to scattering amplitude

When long-range dynamic is important, e.g. NN scattering at LO

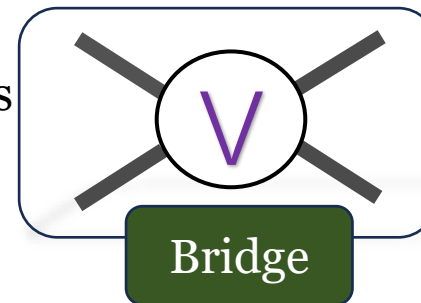


Jin-Yi Pang et.al *JHEP05(2024)168*
Hansen M.T. et.al *JHEP08(2024)075*

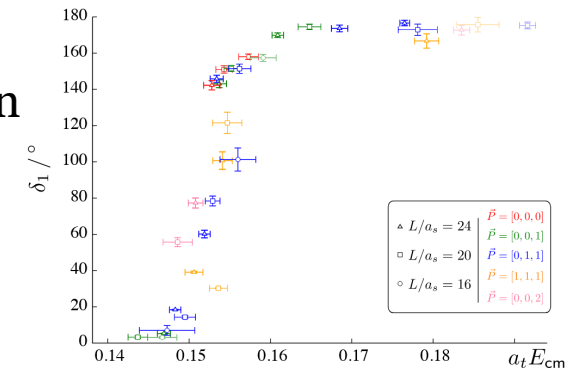
Standard Lüscher Formula



solve Eigenvalues

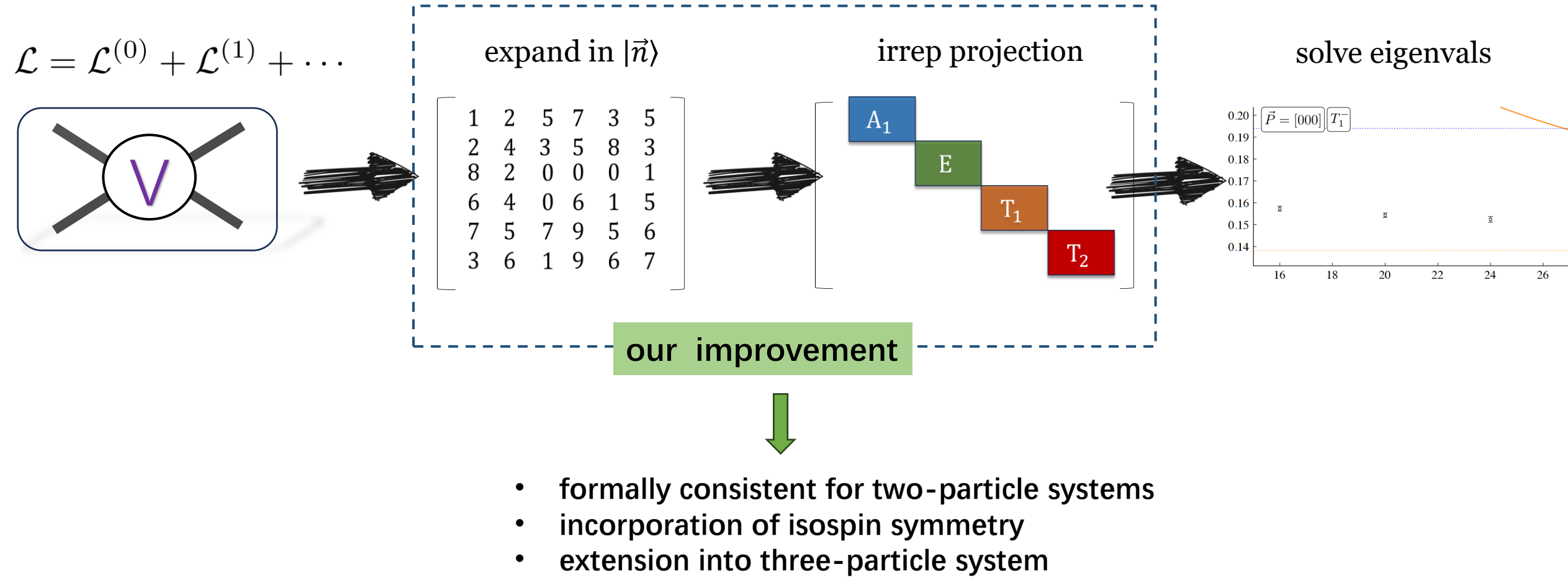


solve
scattering equation



Jia-Jun Wu, T.-S. H. Lee et.al *PhysRevC.90.055206 (2014)*
Jia-Jun Wu, Zhan-Wei Liu et.al *PhysRevD.95.014506 (2017)*
Lu Meng, Epelbaum E. *JHEP10(2021)051*
Lu Meng, Epelbaum E. *PhysRevD.111.034509 (2024),*

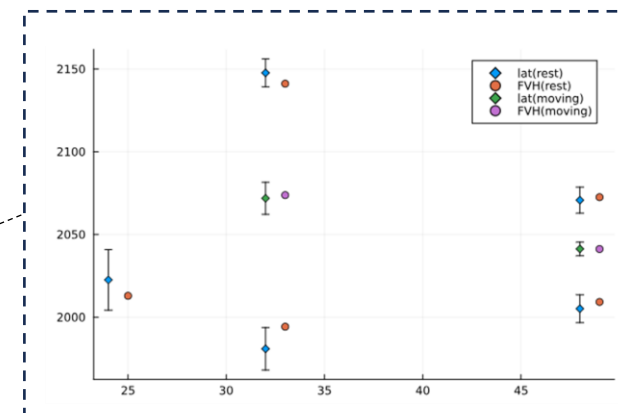
Finite Volume Hamiltonian method : Finite Volume part



Prospect

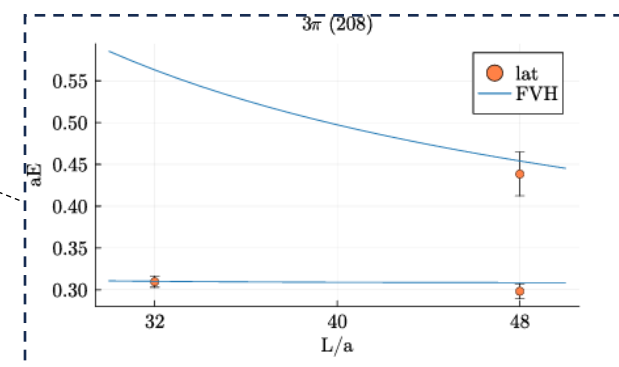
1' spectra of two-particle system

- DD^* scattering (T_{cc}) and NN scattering at LO

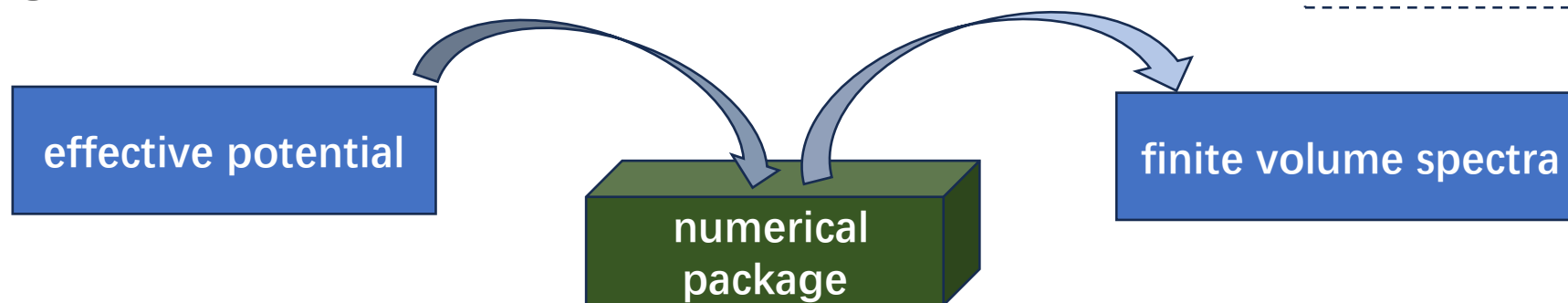


2' spectra of three-particle system

- $\omega \rightarrow 3\pi$ system (Almost done...)
- Roper ($N^*(1440)$) resonance (in preparation...)



3' package



provide convenience for connecting phenomenological and lattice study

Thanks !

