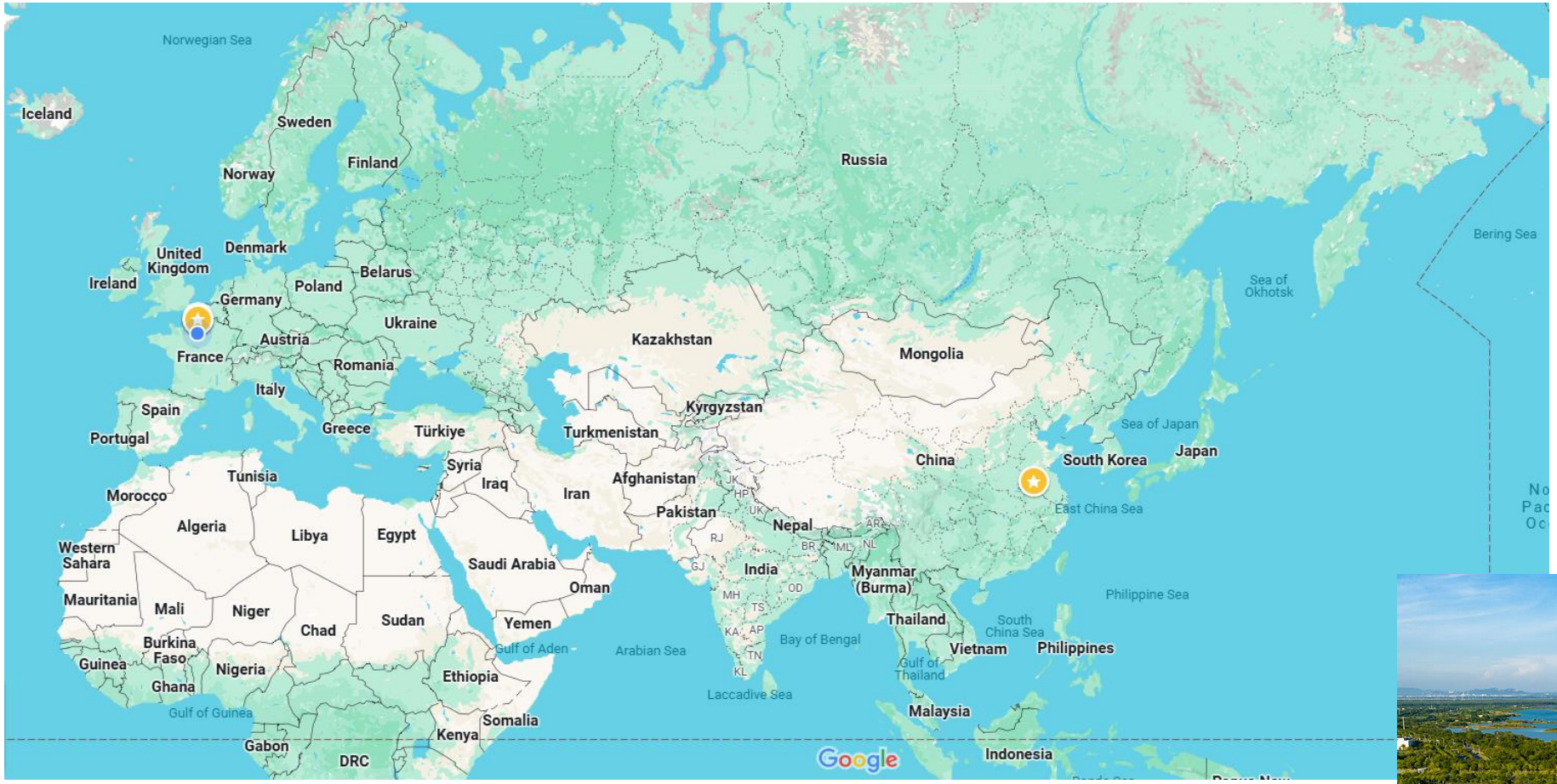
Feng Wu

Journée Nouveaux Entrants, IJCLab

26/03/2025

I was born in Hefei, Anhui Province, China

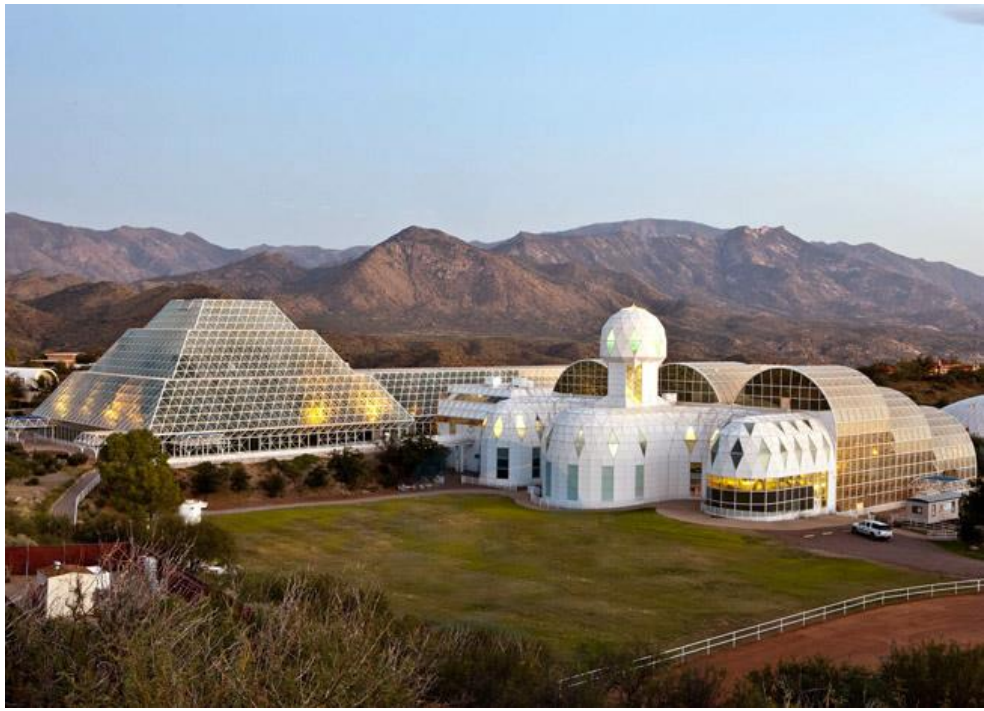


Chen-Ning YANG (杨振宁)
theoretical physicist,
born in Hefei,
parity non-conservation of weak interaction
(1957 Nobel Prize in Physics, with Tsung-Dao Lee),
Yang-Mills theory,
...

I earned my PhD from the University of Arizona in 2024

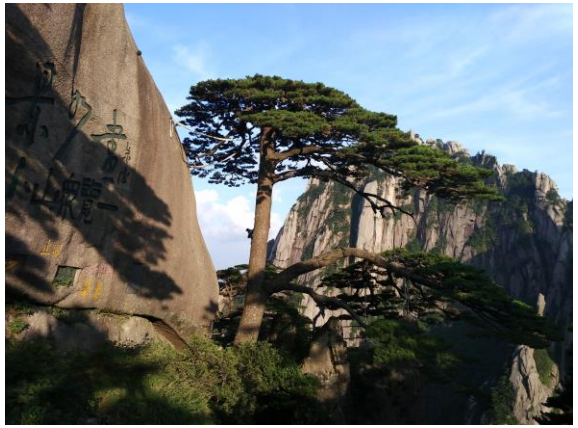
THE UNIVERSITY OF ARIZONA


ARIZONA

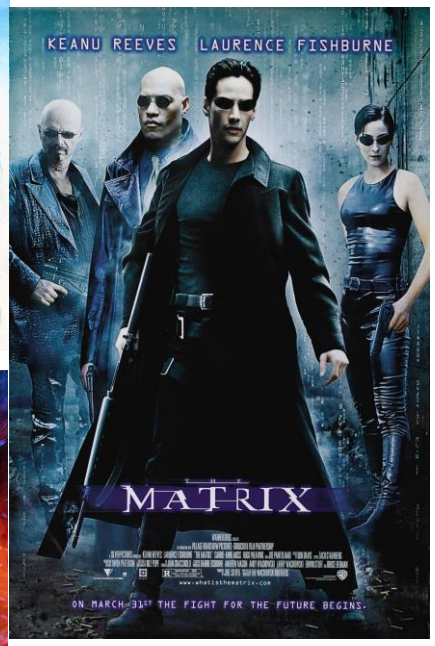


Hobbies

Travel

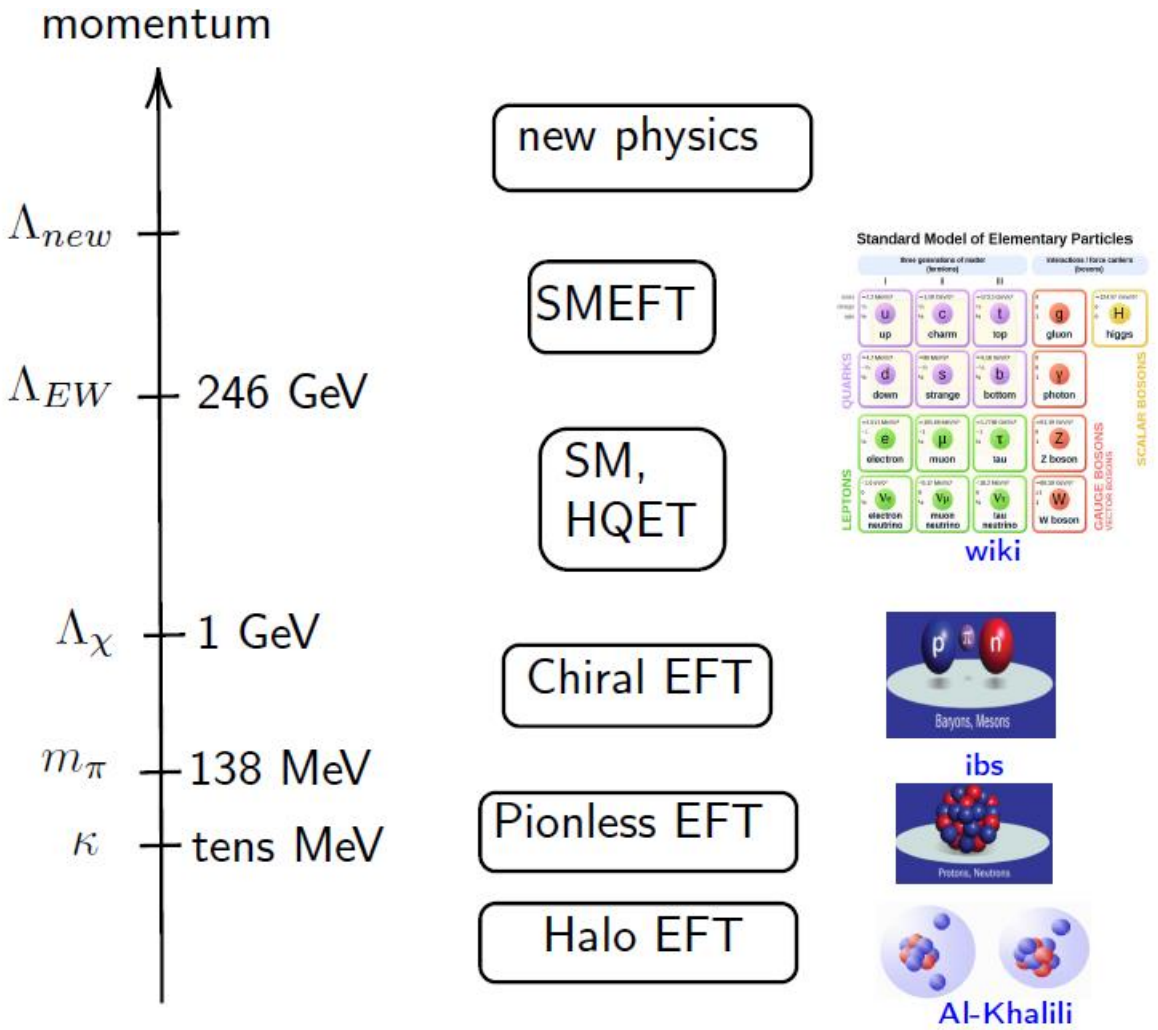


Anime/movies



Effective Field Theories

every theory in physics is an effective theory



unit: $\hbar = c = 1$

Basic ideas:

- ✓ separation of scales
- ✓ degrees of freedom
- ✓ symmetries
- ✓ power counting
- ✓ renormalization

Nuclear and Atomic EFTs

- Chiral EFT: p, n, π
- Pionless EFT ($\not\pi$EFT): p, n
- Halo EFT: halo systems (core + halo particles)
- Short-range EFT (SREFT): spinless particles

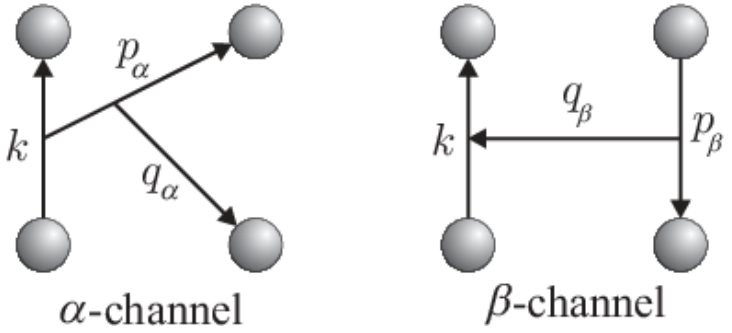
Hierarchy of **scales** ↔various EFTs

I am now a postdoc in the nuclear theory group at IJCLab

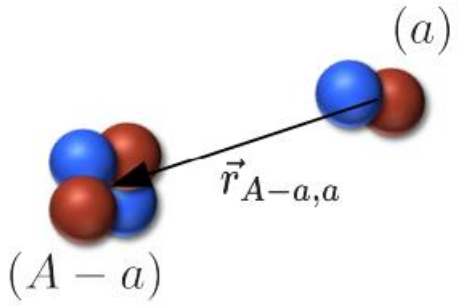
My research now focuses on ***ab initio*** methods for nuclear and atomic few- and many-body systems

ab initio:

- Interactions from fundamental theories, such as nuclear interactions derived from EFTs
- Solve the many-body Schrödinger equation with no or controlled approximations



Faddeev-Yakubovsky



$$|\Psi^{J^\pi T}\rangle = \sum_\nu \int dr\, r^2 \frac{g_\nu^{J^\pi T}(r)}{r} \hat{\mathcal{A}}_\nu \left|\Phi_{\nu r}^{J^\pi T}\right\rangle,$$

no-core shell model/resonating group method

(a unified *ab initio* approach to nuclear structure and reactions)

Thank you!