



## SFB 1245 – Research goals

Explore **strong interactions in nuclei**,  
their role in **astrophysics** and **related fields**

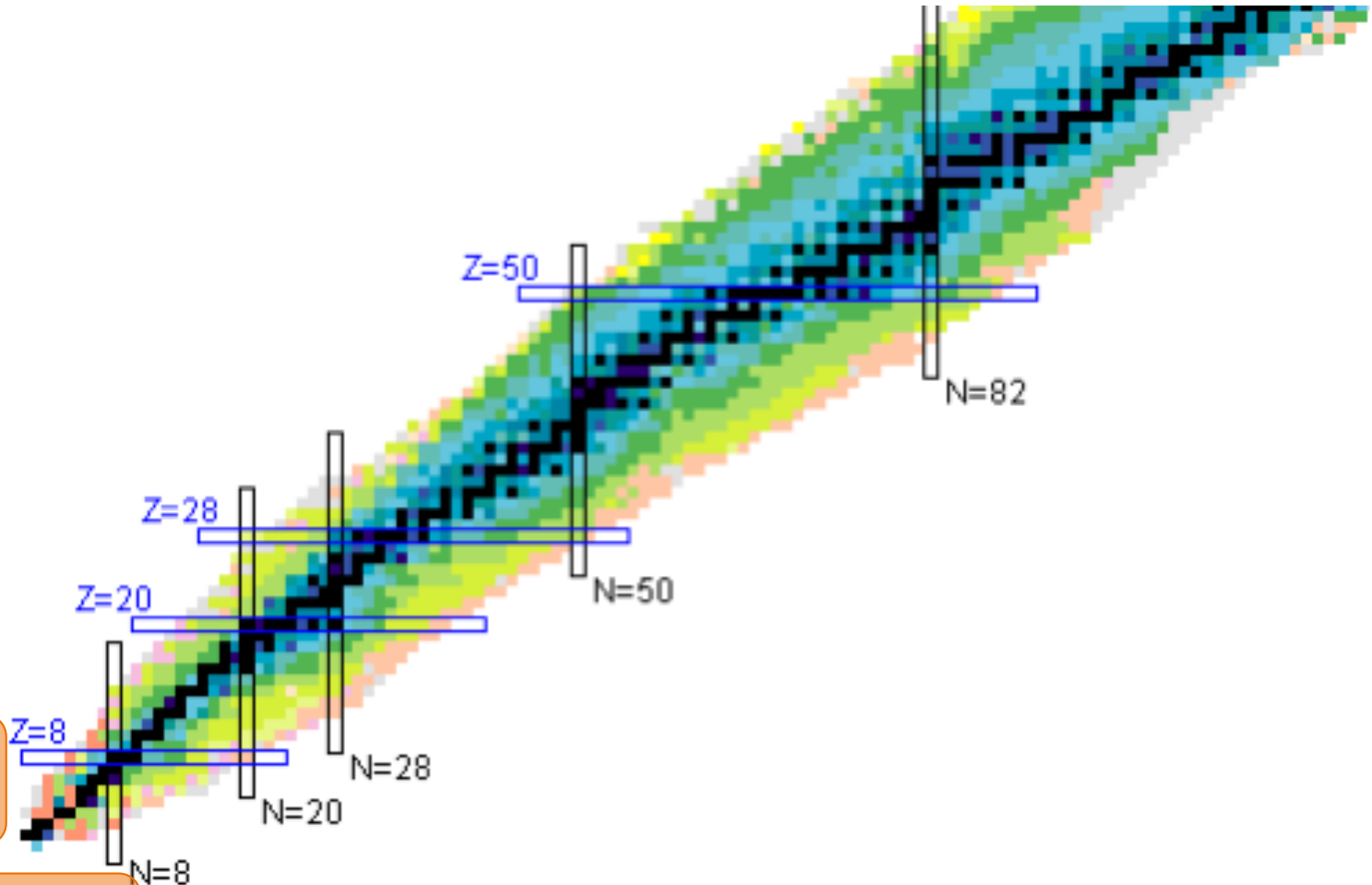
with **unique experiment-theory synergies** in Darmstadt

- How does the nuclear chart emerge from chiral EFT?
- Will our understanding of nuclear forces pass the test of novel precision measurements?
- How do electroweak interactions couple to nuclei?
- How do nuclei, neutrinos, and the equation of state impact the nucleosynthesis in core-collapse supernovae?

# A: Strong interactions and precision nuclear structure



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A02: Light nuclei  
EFT and ab initio

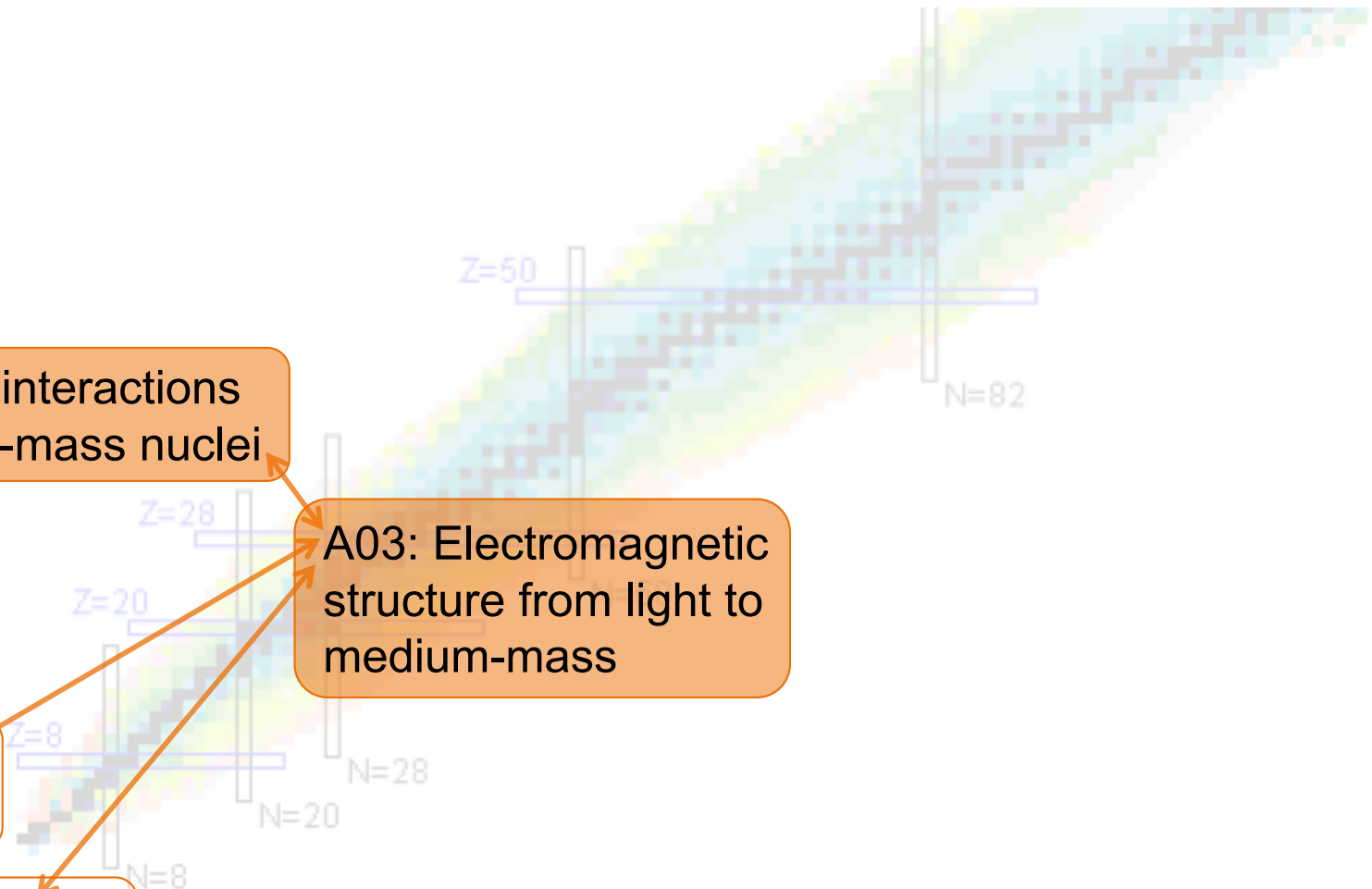
A01: Precision structure  
of light nuclei



# A: Strong interactions and precision nuclear structure



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A04: Strong interactions  
and medium-mass nuclei

A03: Electromagnetic  
structure from light to  
medium-mass

A02: Light nuclei  
EFT and ab initio

A01: Precision structure  
of light nuclei



# A: Strong interactions and precision nuclear structure



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A07: New properties of collective excitations

A04: Strong interactions and medium-mass nuclei

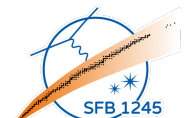
A03: Electromagnetic structure from light to medium-mass

A02: Light nuclei EFT and ab initio

A01: Precision structure of light nuclei

A06: Beyond the neutron dripline

A05: Halos, universal properties and clustering

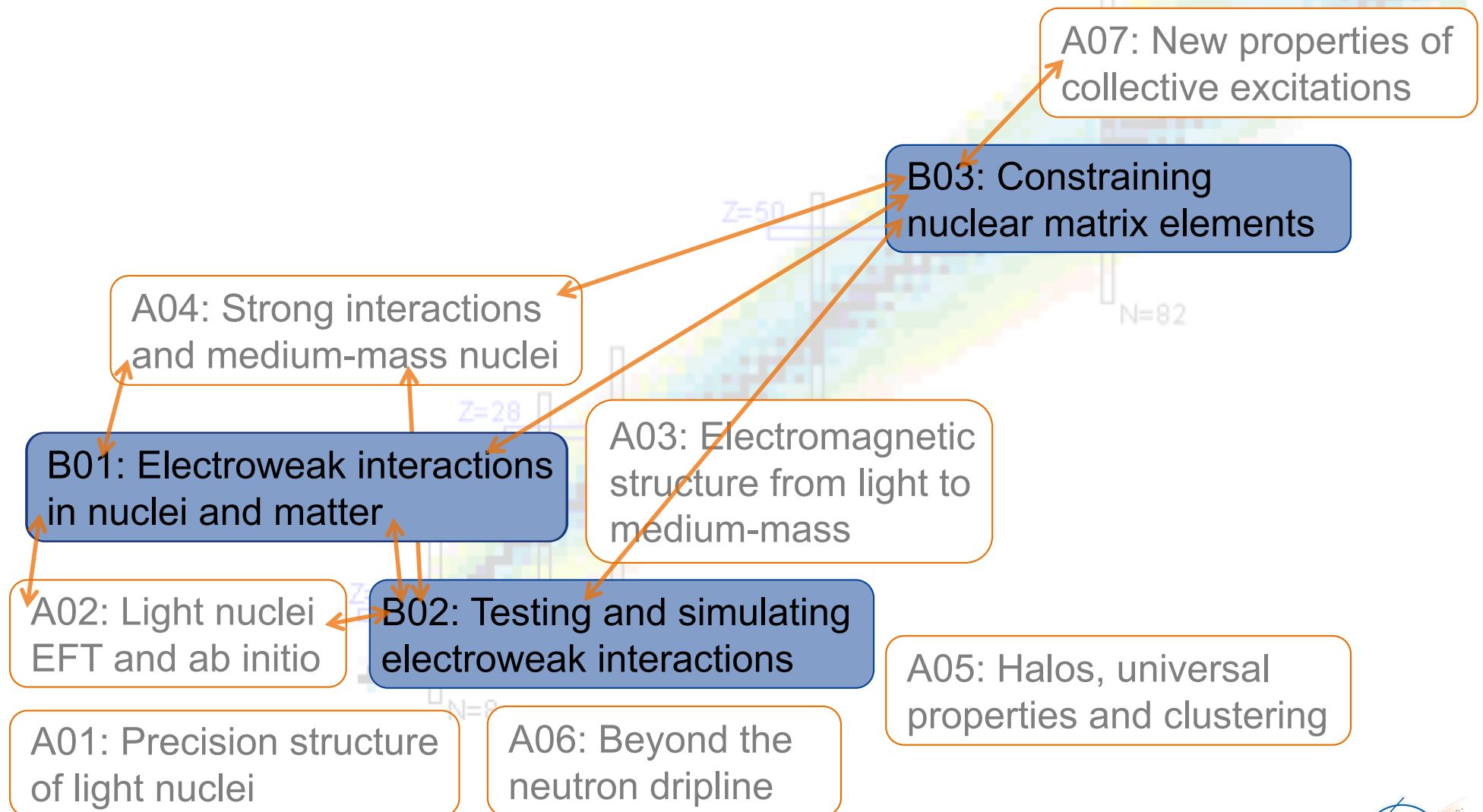




## B: Electroweak interactions and nuclear astrophysics



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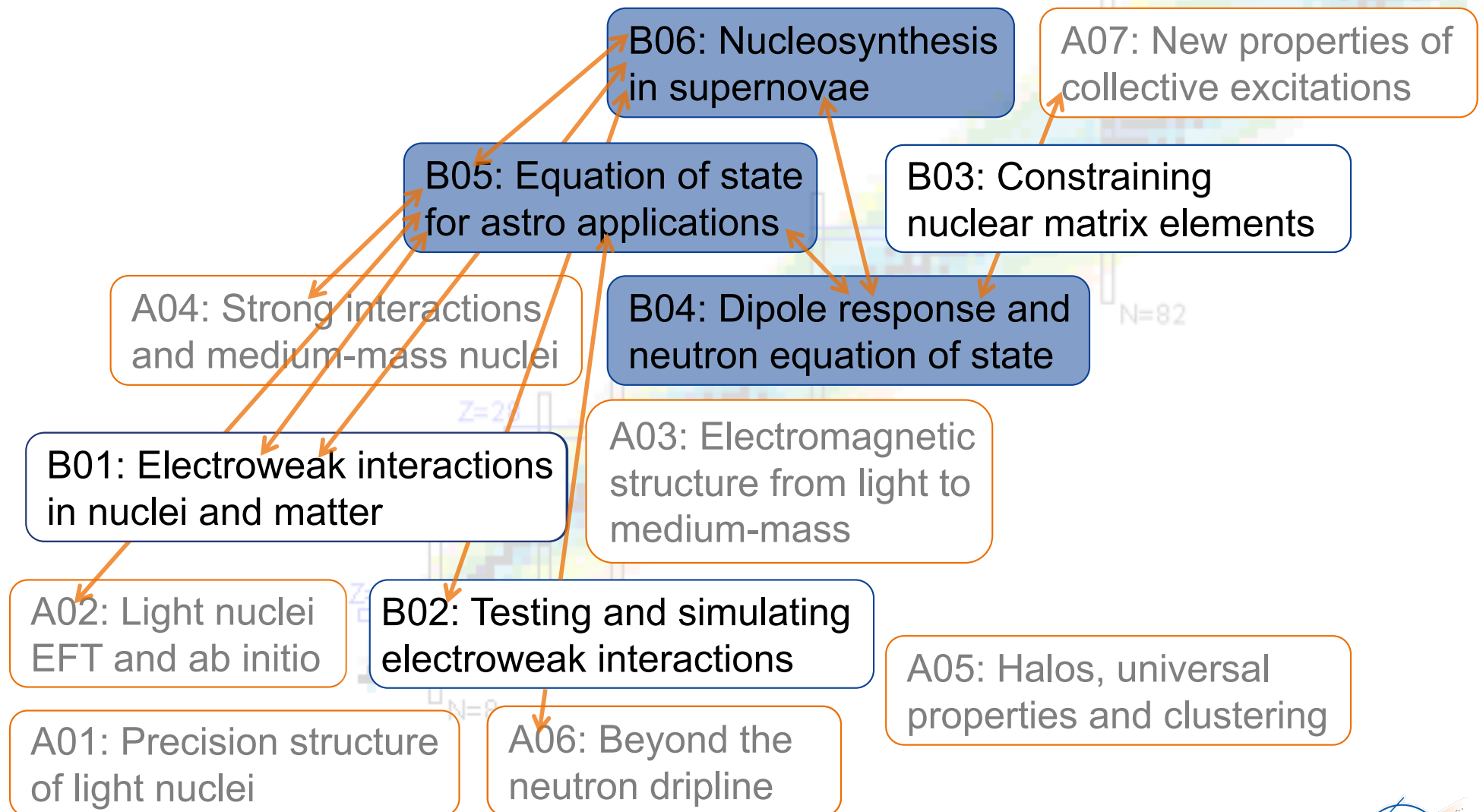




## B: Electroweak interactions and nuclear astrophysics

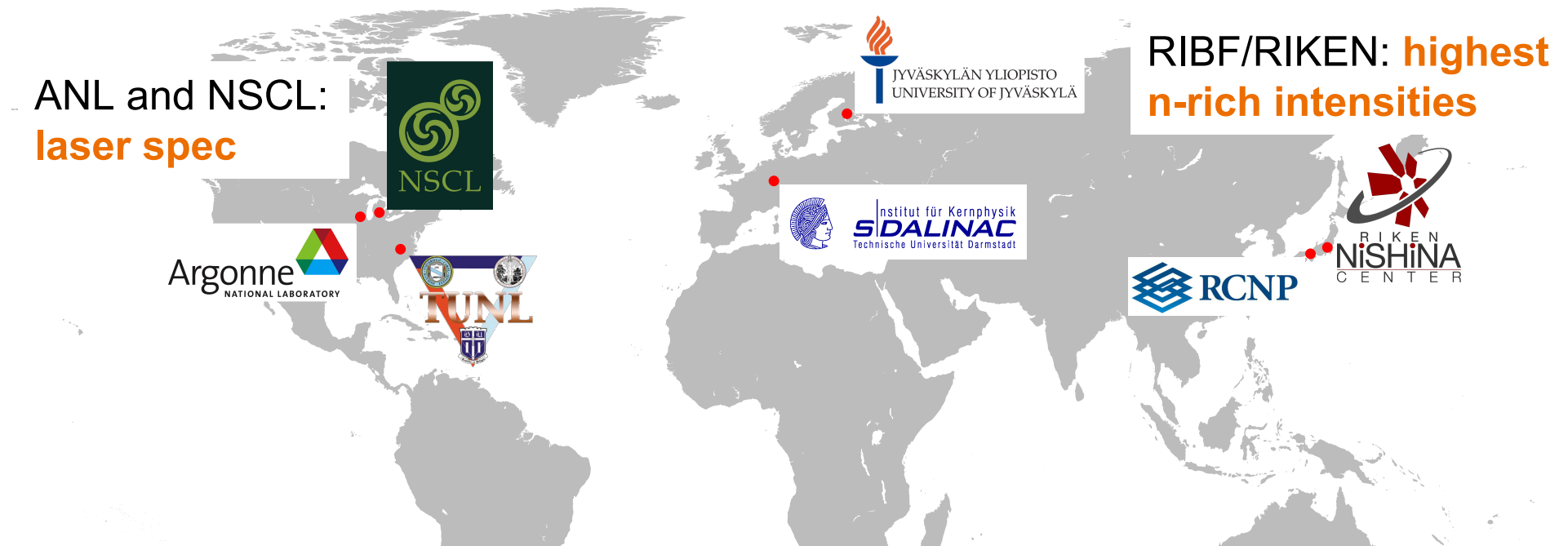


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# Physics at unique facilities

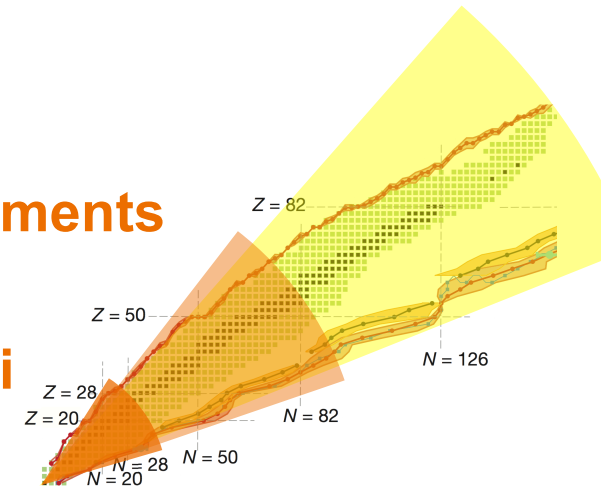
- Best suited for **key experiments**



- Upgrades and investments in **S-DALINAC and detectors**, experimental S-DALINAC program starting fall 2017, talk on Friday
- **External experimental campaigns** mostly completed

# Long-term perspectives – incl. beyond first period

- **Understanding and predicting the nuclear chart based on QCD**
- **Advance nuclear structure with precision experiments**
- **Develop EFTs and ab initio methods to all nuclei**
- **Systematic understanding of nuclear matrix elements**  
 $0\nu\beta\beta$  decay, dark matter direct detection,...
- **Solving the chemical contribution from supernovae**







## Workshop program

- Invited talks + reports from all projects, **please ask questions**
- Thu afternoon: **discussion groups on common topics of interest**
- Fri: report from discussions groups, S-DALINAC, MGK
- Followed by General assembly

**Enjoy our second  
SFB 1245  
workshop!!**

