

DFG FORSCHUNGSGRUPPE
Proposal writing

January 20th, 2026 | Stefan Häusler, Marina Ganeva | JCNS

Administrative part: *de facto* boundaries

Consortium size, budget, personnel structure

Parameter	Green range	Yellow range	Red flag
Consortium size (PIs)	4–8 PIs; 4–6 universities + 1–3 non-university institutes	9–10 PIs with strong methodological justification	$>$10 PIs; looks like Netzwerk / Verbundprojekt
Total budget (4 years)	1.8–2.8 M€ total (Physics FOR typically 2.2–2.6 M€)	$<$1.5 M€ (underfunded) or $\sim$3.0 M€ (scope questions)	$\geq$3.5 M€ without exceptional justification
PhD / Postdoc balance	PhD-heavy structure 5–8 PhD, 2–4 Postdocs	More Postdocs than usual; unclear PD roles	Postdocs dominate (“mini-institute”)

Institutional distribution and personnel concentration

Parameter	Green range	Yellow range	Red flag
Universities vs Helmholtz	Majority of PhD at universities; Helmholtz with targeted scientific roles	1–2 PhD at Helmholtz with physics-driven justification	Most PhD at Helmholtz; institute acts as infrastructure hub
Postdocs per PI	0–1 Postdoc per PI; fractional positions acceptable	2 Postdocs at one PI with strong justification	3+ Postdocs at one partner (group expansion signal)
Project duration structure	48 months; PhD full duration; PD full or partial	Many short-term ($<$24 months) contracts	Fragmented durations; “patchwork” staffing

Coordination, infrastructure, and external partners

Parameter	Green range	Yellow range	Red flag
Coordination module	Present; 30–50 k€/year meetings, workshops, travel	∼60 k€/year; overly detailed “management”	Personnel via coordination; >10–15% of total budget
Equipment & computing	Minimal equipment; laptops, small devices; justified per subproject	GPU nodes / storage with strict scientific justification	Servers, clusters, platform development
Companies (industry)	Associated partner; no or minimal budget; service role	Small service contracts	Major personnel funding; IP-driven narrative

What does it mean for us

if we want to stay in the green area:

We can invite **one** additional university partner

Less postdocs, more PhD students

Less resources for Helmholtz centers

H&W cannot lead or co-lead any subproject, but can contribute as associated partner and get small service contracts

if we stay in green area, reviewers focus on science

Gender equality: how DFG sees it

Formal level (important to know)

No gender quotas in DFG evaluations.
A proposal **cannot be rejected** because of PI gender composition.
Scientific quality remains the primary criterion.

De facto evaluation practice

Reviewers look at **structures**, not raw numbers.
Key implicit question:

Does this Research Unit reproduce existing structural imbalances, or does it consciously compensate for them?

Career stage perspective

Age itself is irrelevant.
Positive signal: mix of senior PIs, mid-career researchers, and visible junior leadership.

Typical Review Board reaction in physics

Male-dominated PI groups are not unusual in physics.
Outcome: **attention point**, not a red flag.

What to do — and what not to do (DFG-safe practice)

What to do

Write a **serious, concrete** section "Gender Equality and Equal Opportunities".

Focus on **structural measures**, e.g.:

transparent recruitment procedures; active encouragement of applications from underrepresented groups; mentoring and supervision structures; family-friendly measures (flexibility, part-time options); support and visibility of early-career researchers.

Use the **Nachwuchs structure** as compensation:

PhD-heavy design; meaningful Postdoc roles; cross-institutional co-supervision; visibility and responsibility for junior researchers.

What not to do

Do **not** add a female PI "for balance" without a real scientific role.

Do **not** overclaim or promise to "fix the field".

Do **not** rely on vague statements or generic diversity language.

Do **not** treat gender balance as a numbers game.

Do **not** hide the issue — address it calmly and structurally.

Current PI composition is **not a problem for DFG**, but it must be **handled intelligently in the text**.

Scientific part

DFG FOR scientific boundaries

how to stay in the green zone

One shared scientific core question The FOR addresses a single, well-defined scientific problem; subprojects provide complementary angles, not independent topics.

Scientific necessity of the consortium The consortium is required by the science itself (methodological complementarity, scale, theory–experiment interplay), not by convenience.

Clear separation: joint programme vs subprojects Joint programme defines common objectives and milestones; each subproject contributes a specific, non-overlapping task.

Depth over breadth A limited, prioritised set of methods and questions; no “toolbox FOR” or platform-style design.

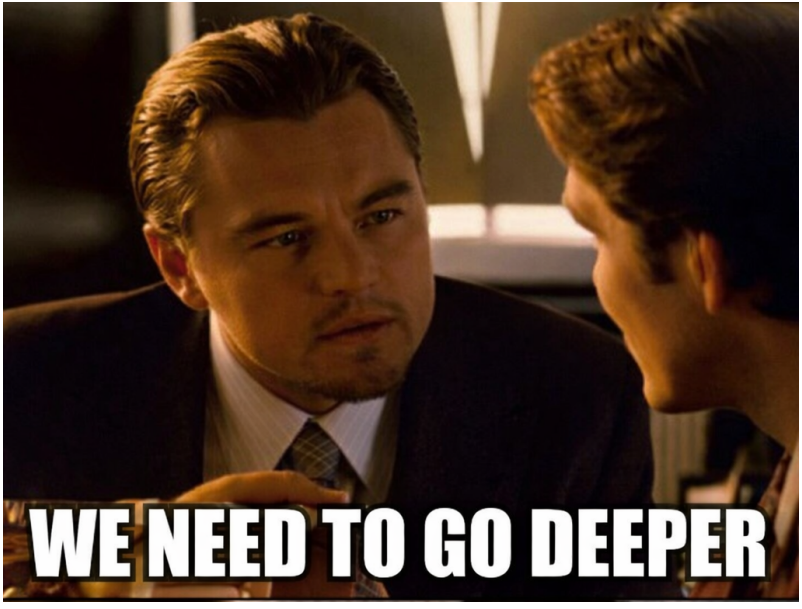
Iterative scientific logic Built-in feedback loops (e.g. theory experiment, modelling data) that actively shape the research trajectory.

Clear added value of the FOR format It is explicit what becomes possible only in the Research Unit format and what scientific identity emerges beyond individual projects.

What does it mean for us?

mindset “physics first”

What does it mean for us?



Overarching topic

Physics-informed multimodal inference for ill-posed inverse problems in neutron and X-ray experiments

Overarching topic

Physics-informed multimodal inference for ill-posed inverse problems in neutron and X-ray experiments

- ☑ It foregrounds a **fundamental physics problem** (*ill-posed inverse problems*).
- ☑ The term *inference* positions AI/ML clearly as a **scientific method**, not as a goal in itself.
- ☑ *Physics-informed* explicitly addresses reviewer concerns about interpretability and black-box approaches.
- ☑ *Multimodal* directly encodes the **core scientific hypothesis** of the FOR: reduction of fundamental ambiguity through complementary physical projections.
- ☑ Explicit reference to *neutron and X-ray experiments* defines a **clear but sufficiently broad experimental domain**, appropriate for a Forschungsgruppe rather than a single project.
- ☑ Overall, the title communicates a **coherent, physics-driven research agenda** that clearly requires an integrated research unit.

Suggested project structure

Subproject A (Identifiability & theory): Which structural and dynamical quantities are, in principle, identifiable from scattering data under realistic experimental constraints?

Subproject B (Physics-informed multimodal inference): How can neutron and X-ray data be combined within a physics-informed probabilistic framework to reduce ambiguity and propagate uncertainty consistently?

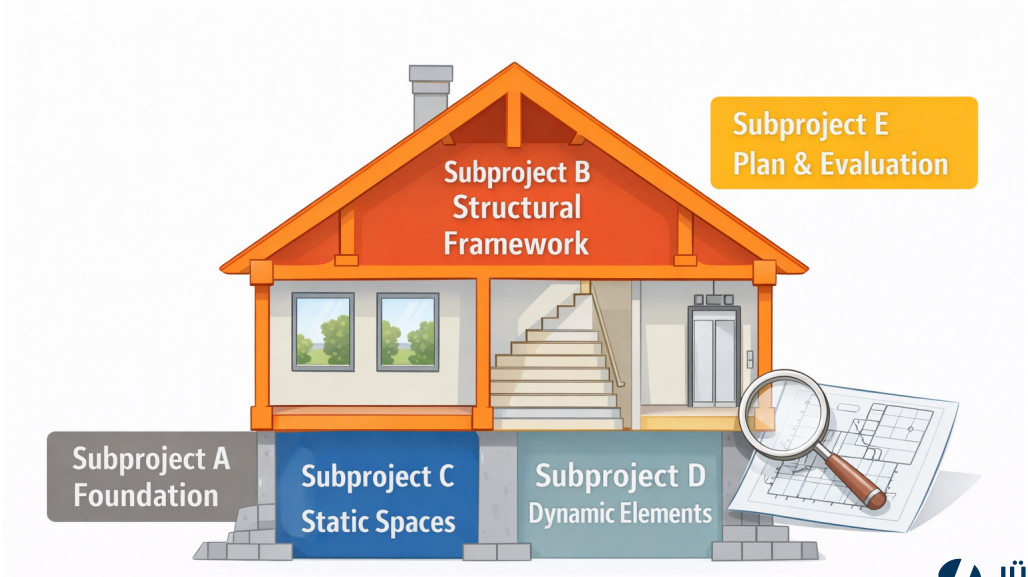
Subproject C (Static benchmark systems): For representative static systems, how much ambiguity and uncertainty is removed by multimodal analysis compared to single-modality inference?

Subproject D (Dynamics & non-equilibrium): In time-resolved and non-equilibrium experiments, which aspects of structure–dynamics coupling can be inferred reliably, and where are the fundamental limits?

Subproject E (Synthesis & validation): Under which physical conditions does multimodal inference yield genuinely new observables and general insight beyond improved fits in individual case studies?

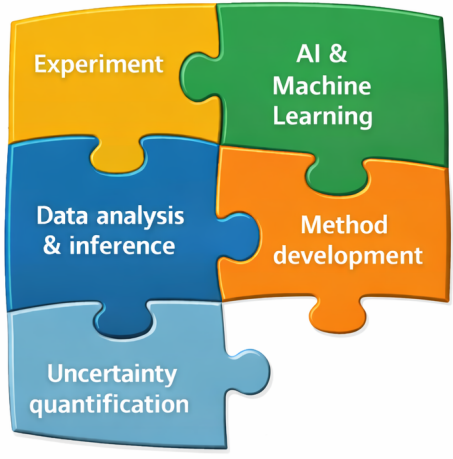
Suggested project structure

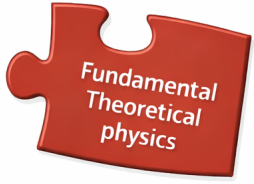
Interaction between subprojects



Required changes in the team

We need a strong theoretician





Required theoretical expertise

- ☐ **Non-equilibrium many-body / statistical physics** — to explain the physical origin of parameter correlations and collective effects, clarifying why certain parameters cannot be disentangled even with ideal data.

- ☐ **Physical interpretation of dynamics** — to identify which dynamical scenarios are physically distinguishable in time-resolved experiments and which are fundamentally equivalent from a measurement perspective.

- ☐ **Theory-driven limits of inference** — to separate physical non-identifiability from algorithmic or numerical uncertainty, defining which quantities qualify as meaningful observables.

Do you know someone? Let me know, please.

Questions to think about

Do you agree with the proposed project structure (Subprojects A–E)? If not, what would you change and why?

In which subproject(s) do you see your main scientific contribution? What role would you like to take (e.g. lead, co-lead, methodological contributor, experimental benchmark provider, synthesis)?

Which type of personnel would be required for your intended contribution? Would you envisage doctoral researchers and/or postdoctoral researchers, and for which scientific tasks?

Which use cases or experimental systems would you associate with the subproject(s)? Why are they particularly suitable for addressing the key scientific questions?