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Complex pathways in multistable matter

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Propositions

Accompanying the dissertation

Complex pathways in multistable matter

1. Multistability is not merely a material property but a design principle for programmable function
This dissertation
2. Designing complex pathways requires a hierarchical approach
chapter three
3. Vectorial driving shows behavior with no counterpart in scalar driving
chapter two
4. Dynamic driving is a form of vectorial driving that enables selectivity of complex sequential pathways
chapter five
5. The value of a model lies in its falsifiability, not in its ability to fit existing data
*R.S. Zahler, H.J. Sussmann, Nature **269**, 759-763 (1977)*
6. Memory is not stored in a static configuration but in the dynamical pathways through configuration space
*N.C. Keim et al, Rev. Mod. Phys. **91**, 035002 (2019)*
7. A small number of interacting elements is sufficient to generate highly nontrivial sequential behavior
*N.C. Keim, J.D. Paulsen, Sci. Adv. **7**, eabg7685 (2021)*
*C.W. Lindeman, S.R. Nagel, Sci. Adv. **7**, eabg7133 (2021)*
8. Near-perfect return-point memory can arise even in systems that fundamentally violate the no-passing property
*M. Mungan et al, Phys. Rev. Lett. **123**, 178002 (2019)*
9. The direct societal impact of research does not have to be clear *a priori*; curiosity-driven science should be appreciated and funded.

Colin Michel Meulblok
Leiden, 9 september 2026