

# Zernike Colloquium

March 6<sup>th</sup>, 2025  
16:00h  
NB4 5111.0022

## Transport of Spin and Charge Polarization



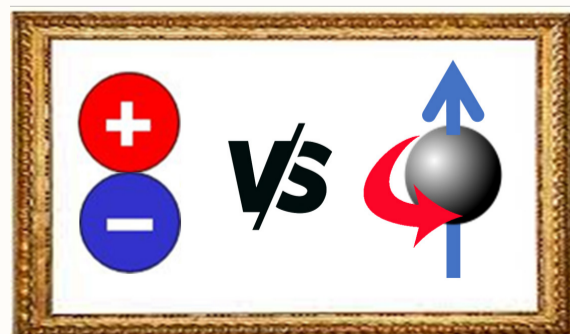
by Gerrit E.W. Bauer



The duality between electric and magnetic dipoles in the Maxwell equation of the vacuum is rendered complicated in condensed matter. In particular, the elementary excitations that carry the dipoles of magnetic and ferroelectric orders, namely magnons and ferrons, respectively, despite sharing some feature are quite different [1]. They received asymmetric attention from the condensed matter community in the past: While “magnonics” is a well-established research field, “ferronics” is just starting up. I will briefly introduce the electric and magnetic dipole-carrying elementary excitations that allow the modeling of many observables and may lead to applications in thermal, information, and communication technologies. I hope to present new results from both fields (but some are still under embargo).

### References

[1] G.E.W. Bauer, P.Tang, R. Iguchi, J. Xiao, K. Shen, Z. Zhong, T.Yu, S.M. Rezende, J.P. Heremans, and K. Uchida, Perspective: Polarization transport in ferroelectrics, Phys. Rev. Applied 20, 050501 (2023).



Coffee from 15:30h  
Drinks & Snacks after



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 groningen  
 faculty of science  
 and engineering