

# EINLADUNG zum IFP-SEMINAR

## Optimizing superconductivity: from cuprate via nickelate to palladates

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Host: Karsten Held

Termin: Mittwoch, 23. Oktober 2024, 16:00 Uhr

Ort: TU Wien, Freihausgebäude

Wiedner Hauptstraße 8-10, 1040 Wien

Seminarraum DC rot 07 (roter Bereich, 7. OG)

Oder via ZOOM

<https://tuwien.zoom.us/j/63020566887?pwd=RmYvRmVwOGU5YVBrOHpodWRKaHFWQT09>

*Vor dem Vortrag gibt es ab 15:30 Kaffee und Kekse*

### Abstract:

The discovery of infinite-layer nickelate superconductivity offers a new possible route to realize cuprate analog systems [1]. We first analyzed this compound using a combination of density functional theory and dynamical mean field theory (DFT+DMFT) and then calculated the critical temperature using the dynamical vertex approximation. We obtained a  $T_c$ -dome structure centered around 20% Sr-doping [2], which agrees with subsequent experiments. Based on the successful description of the experimental phase diagram, we further comprehensively study the superconducting instability in the single-band Hubbard model to search for sweet spots for high  $T_c$ . Combined with first-principles calculations, we propose that palladates would be a possible alternative to nickelates for optimizing model parameters and obtaining a higher  $T_c$  [3].

[1] D. Li, K. Lee, B.Y. Wang, M. Osada, S. Crossley, H.R. Lee, Y. Cui, Y. Hikita, H.Y. Hwang, Nature 572, 624–627 (2019).

[2] M. Kitatani, L. Si, O. Janson, R. Arita, Z. Zhong, and K. Held, npj Quantum Mater. 5, 59 (2020).

[3] M. Kitatani, L. Si, P. Worm, J. M. Tomczak, R. Arita, and K. Held, Phys. Rev. Lett. 130, 166002 (2023).

Supported by: