JITCP Seminar

THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
[Friday morning, 11:00 am, Zoom (online)]

An Interorbital Pairing Interaction in $KTaO_3$

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Recently, superconductivity has been discovered for the electron gas formed at the interface of $KTaO_3$ with other oxides [1], T_c being almost an order of magnitude larger than what is seen for $SrTiO_3$. The largest T_c is for <111> interfaces, with T_c for <110> interfaces about half of this, and that for <001> interfaces either extremely small or non-existent. This points to the role of orbital degeneracy, the degeneracy of t_{2g} states being maximal for <111>, and completely lifted for <001> due to interface confinement. A theory that encompasses this effect is pairing via the transverse optic mode that leads to ferroelectricity in related perovskites, as to linear order this involves inter-orbital interactions (which in turn gives rise to a large Rashba effect that is strongly sensitive to orientation). In this talk, I will compare this theory to relevant data for $KTaO_3$, in particular the doping dependence of T_c and how T_c and thermodynamic and transport properties vary with interface orientation [2].

[1]. C. Liu et al, Science 371, 716 (2021).
[2]. C. Liu et al, arXiv:2203.05867.

Online Zoom Seminar
Friday, February 3, 2023, 11:00 am
Meeting ID: 959 9261 0981
Password: 25600
https://hku.zoom.us/j/95992610981?pwd=cDZLWlFKOC8vamFNWE9hMlZzTEpOZz09

Host: Professor Gang CHEN, The University of Hong Kong

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Phone: 28592360, Fax: 25599152. Anyone interested is welcome to attend.