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# Conductivity in oxide electronics - case studies of self-doping and bandgap tuning

The first part will address the phenomenology and microscopic investigation of resistive switching in different binary and ternary oxides including a brief discussion of recent developments in technology transfer between academia and industry. The change of electrical conduction under electric cycling (resistive switching) is currently experiencing a renaissance for non-volatile memory devices with non-destructive read-out. While the phenomenon is encountered in a vast variety of materials and configurations, most of them are unsuitable for applications for either physical or process compatibility reasons. Nonetheless, at the present stage, several material systems and concepts are competing for industrial applications and our results indicate read-write times below 10 ns, high retention times and a large potential for ultrahigh density for oxide electronics based on e.g. TiO2 while fatigue still remains a challenge.
The second part is dedicated to very recent progress in bulk photovoltaics. While conventional photovoltaics rely on charge separation across a pn-junction, bulk photovoltaics benefit from the polar axis is pyroelectrics for charge separation after photoexcitation. While the effect had already been reported in the late 70s, its application reached an impasse due to the large bandgap of pyro- and ferroelectrics which a) provides a negligibly low yield for visible excitation and b) prevents the use as a current source due to the large internal resistance. Multiferroic materials with a ferroelectric and a magnetic order parameter do exhibit a pronounced electron-electron coupling and consequently a substantial reduction of the band-gap. Our initial data on Bi2FeCrO6, a multiferroic double perovskite reveal that the degree of cationic ordering on the B-site is the key to bandgap tuning.

Die Vorträge finden, wenn nicht anders angegeben, jeweils um **16:15**
im Gebäude der Materialwissenschaften, Lichtwiese, Petersenstr. 23, **Raum 77** statt