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**Interplay between polarization and conductivity in $BiFeO_3$ thin films** SAEEDEH FAROKHIPOOR, BEATRIZ NOHEDA PINUAGA, Zernike Institute for Advanced Materials, Netherlands — $BiFeO_3$ (BFO) is a rhombohedrally distorted, ferroelectric, antiferromagnetic perovskite and one of the few room temperature multiferroics. We've previously reported on conduction at $71^o$ domain walls in BFO thin films grown on $SrRuO_3$-buffered $SrTiO_3$ substrates. For clarifying the origin of conductivity in domain/domain walls, the conduction mechanisms have been extensively studied. The large current regime is determined by Schottky emission from the tip. The migration of oxygen vacancies to the domain walls lowers the Schottky barrier heights at the interface with the metallic tip compared to that in the domains, which results in the observed difference of conductivity in domains and domain walls. In this work we investigate the tunability of the conductivity upon changes in the electrode's work function, as well as the interplay between polarization and conductivity in BFO thin films.

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