Wilfrid Prellier

**High-throughput Synthesis of Oxide Thin Films**

Interest in thin film transition metal oxides is driven in part by the potential technological application of devices exploiting intriguing phenomena, i.e. oxide electronics, and in part by the novel structures and properties observed in epitaxial oxide films, using phase, strain, and interfacial engineering. However, in spite of the large number of observations and promise of epitaxial oxide thin films, most of the investigations have been focused on films on low-index commercially-available single-crystal substrates, which have limited the scope of the study.

Here, we develop a high-throughput synthesis process (called combinatorial substrate epitaxy) where an oxide film is grown epitaxially on a polycrystalline substrate. Based on few examples like BiFeO3 or Ca2MnO4, we will show how functional properties could be investigated across the entirety of epitaxial orientation space, and provide a library of physical property observations. Ultimately, it will expand our understanding of engineering function into transition metal oxides.