

# ITEX (Ion TEXTuring) Update

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Fast, simple, inexpensive way to make highly  
textured buffer layers

DOE Superconductivity for Electric Systems Program

# ITEX Approach

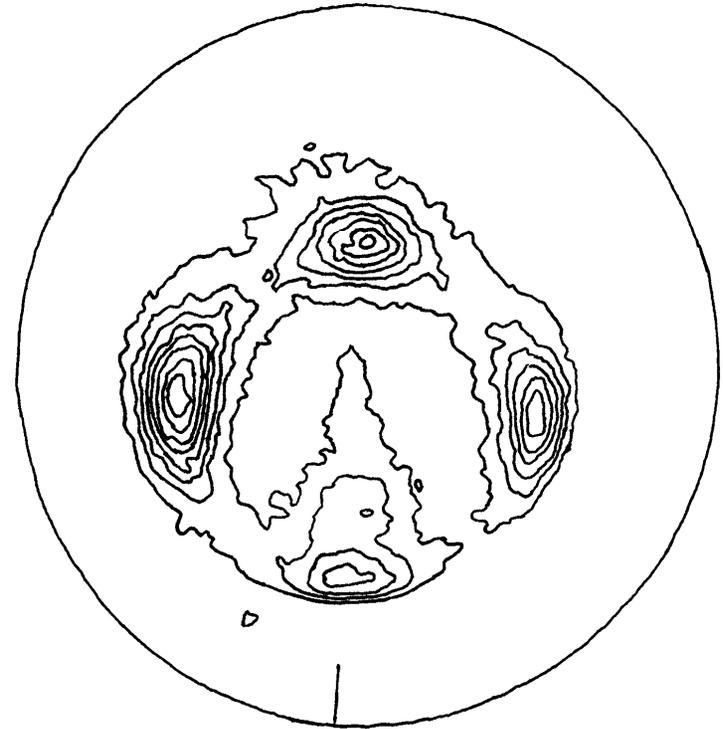
- Film deposition and ion bombardment are **separate rapid steps**
  - Amorphous layer synthesis (a-YSZ),  $>3\text{nm/s}$
  - Oblique ion bombardment ( $\text{Ar}^+$ ),  $\sim 1\text{ min}$
- Bombarded surface smooth ( $\sim 2\text{ nm}$ ) without substrate polish
- IBAD has features in common with ITEX - explore in collaboration with LANL

# ITEX YSZ texture

- ITEX (001)
  - Best for YBCO epitaxy, similar to IBAD
  
- ITEX (211)
  - See current *Appl. Phys. Lett.* (LBNL & AMSC)
  - Simple robust process, highly reproducible

# (103) YBCO Pole Figure Reduced Tilt on CeO<sub>2</sub>/YSZ

- YBCO tilt  $\sim 14^\circ$
- (211) YSZ and CeO<sub>2</sub> :  
tilt of  $35^\circ$
- Can tilt be reduced to  
zero?

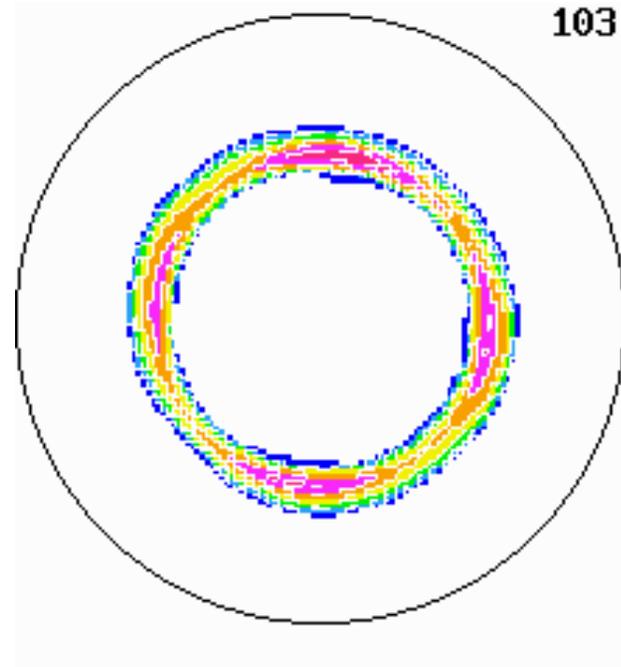


YBCO/CeO<sub>2</sub>/  
ITEX(211)

# YBCO/ITEX 211 YSZ Pole Figures

YBCO 103

No YBCO tilt  
w/o  $\text{CeO}_2$  buffer



# ITEX SUMMARY

- A **rapid** method to make textured buffer layers
- Strong c-axis YBCO texture obtained on both ITEX 001 and 211 YSZ buffers
- Good smoothness without substrate polish
- In-plane texture alignment must be improved for high  $J_c$  films