

# Novel 30 mm wide IBAD-MgO REBCO coated conductors developed at the KC<sup>4</sup> facility

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## KC<sup>4</sup> : KIT - CERN joint open collaboration on HTS coated conductors



The KC<sup>4</sup> PLD 600 chamber housed at ITEP, © Bruker [1].

Small scale R&D to large scale requirements

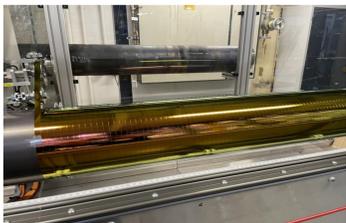
Tailored pinning and novel tape architectures



High quality coated conductors

Desired length and width for various applications

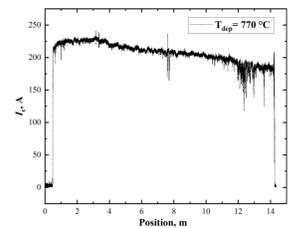
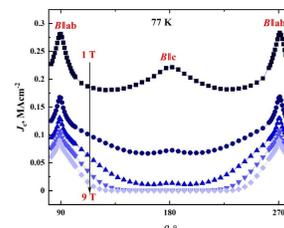
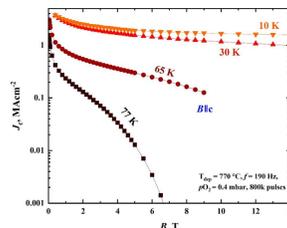
### Promising results on 12 mm wide IBAD MgO tapes



Metal substrate wound around the rotating drum before PLD deposition of the HTS film.



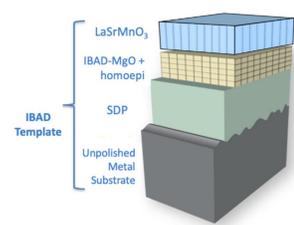
Central Unit of PLD 600 housing the target holder where the deposition occurs.



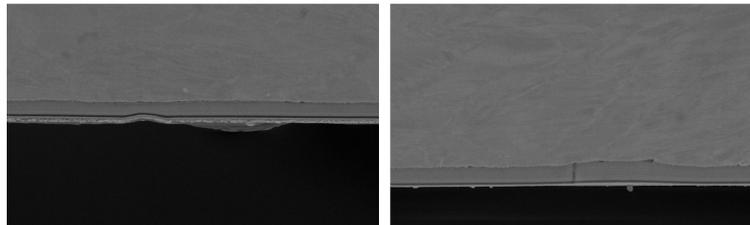
## First ever successful deposition of REBCO films on 30 mm wide IBAD-MgO tapes



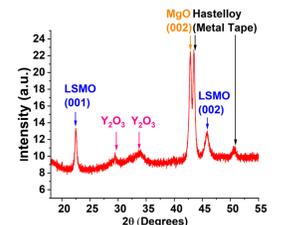
30 mm wide IBAD-MgO template from iBeam Materials.



IBAD-MgO template showing the various buffer layers © iBeam Materials.



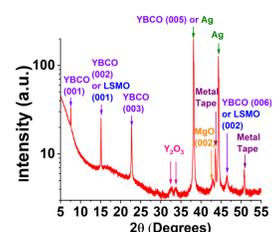
SEM cross-sections showing the Hastelloy C-276 substrate and the buffer layers of the moderate texture template (left) and the good template (right).



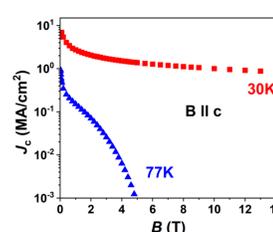
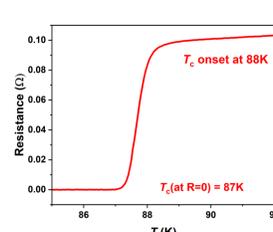
$\theta$ -2 $\theta$  XRD scan of the bare 30 mm wide tape.



Maximum self-field inductive  $J_c$  at 77 K is 1.09 MA/cm<sup>2</sup> as measured on a 30 mm x 60 mm piece of HTS tape.



Good c-axis orientation and phase purity observed for the YBCO film.



Highly uniform



$J_c > 1 \text{ MA/cm}^2$  at 30 K and 10 T

Plan for longer lengths up to 10 m

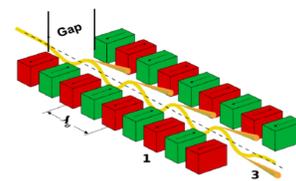


Width tailorable to many applications

### Potential applications of wide REBCO CCs



RF Cavities, © F. Marhauser, Jefferson Lab



Undulators [2]



DUDA Magnets [3]

### Acknowledgement

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### References

- [1] B. Holzapfel, 1<sup>st</sup> HiTAT Workshop 2023, CERN, Geneva.
- [2] J. Pflueger, European XFEL, CERN Accelerator School on FELs and ERLs, 2016.
- [3] Tabea Arndt *et al* 2021 *Supercond. Sci. Technol.* **34** 095006.