

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Simulation of the vortex dynamics in a real pinning landscape of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ coated conductors¹ IVAN SADOVSKYY, ALEXEI KOSHELEV, ANDREAS GLATZ, Argonne Natl Lab, VOLKAN ORTALAN, Purdue University, MARTIN RUPICH, American Superconductor, MAXIME LEROUX, Argonne Natl Lab — We present a critical current analysis of a real high-temperature superconducting (HTS) sample in a magnetic field by combining state-of-the-art large-scale Ginzburg-Landau simulations with reconstructive three-dimensional scanning transmission electron microscopy tomography of the pinning landscape in Dy-doped $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$. This methodology provides a unique look at the vortex dynamics in the presence of a complex pinning landscape, responsible for the high current-carrying capacity characteristic of commercial HTS wires. Our method demonstrates very good functional and quantitative agreement of the critical current between simulation and experiment, providing a new predictive tool for HTS wires design.

¹Work was supported by the Scientific Discovery through Advanced Computing (SciDAC) program funded by U.S. Department of Energy, Office of Science, Advanced Scientific Computing Research and Basic Energy Sciences.

Ivan Sadovskyy
Argonne Natl Lab

Date submitted: 05 Nov 2015

Electronic form version 1.4