

US DOE HEP funded work in collaboration with FNAL and Cornell

JLab: FY18 “Cost reduction R&D”

6 single-cell low temperature doping (LTD, aka “infusion”) test cycles

- 2 FG + 1 LG high-gradient cavities [simultaneous EP and HT-LTD, **with samples**]
- Upgraded furnace controls on thermal profile and gas species monitoring [Phase I almost complete]
- Standardized SIMS analysis of samples @ VT to build mechanistic insight

US DOE BES funded work in collaboration with SLAC, FNAL, and Cornell

JLab: FY18 R&D for LCLS-II HE

Qualify N doping recipe with higher quench field and reduced EP removal sensitivity.

- 3 qualified cavities, new candidate protocol [simultaneous EP and HT, **with samples**]
- Standardized SIMS analysis of samples @ VT to build mechanistic insight

US DOE NP funded work in collaboration DESY, KEK, and FSU

JLab: FY18 R&D for LCLS-II HE

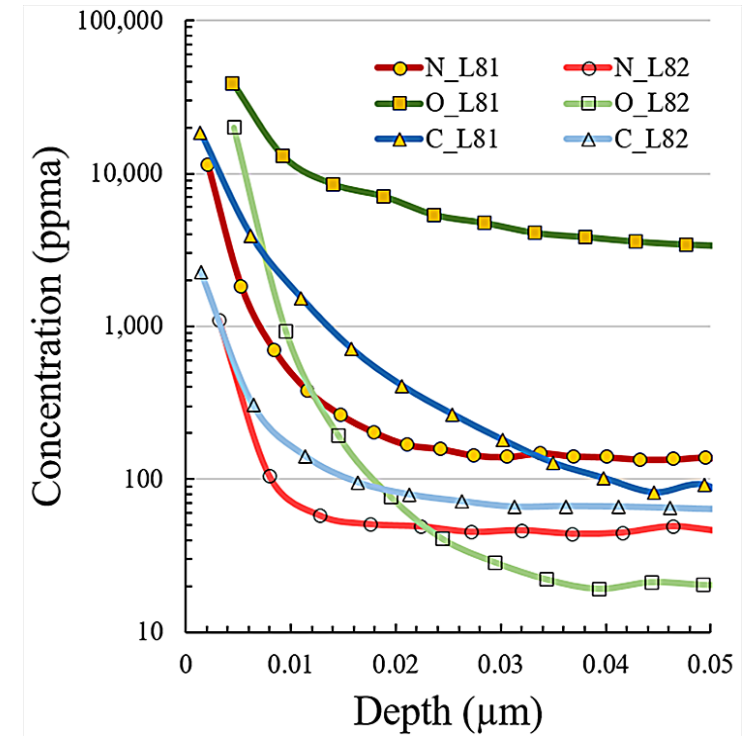
JLab cavities, various trial protocols [**with samples**]

Sample exchanges with DESY & KEK

Standardized SIMS analysis of samples @ VT to build mechanistic insight

Want to provide a means of cross-calibrating doping facilities and procedures at different labs.

- Make choices for economy:
 - Standardized 6 × 10 mm Nb sheet samples
 - Pre-annealed 900°C/50 μm BCP/nanopolished
 - Doping or LTD @ JLab or collaborator
 - EP of doped samples, e.g. 5-10 μm
 - Standardized 0-300 nm dynamic SIMS depth profile
 - 4-5 samples per SIMS load, with implant standard



Example data from Virginia Tech Cameca 7f

<https://arxiv.org/abs/1803.07598>

Accepted for pub. JVST-B

- We have a limited number of samples that we can provide and analyze at no cost to collaborators.
- Have sent some to Cornell, FNAL, and DESY.
- We can also exchange samples
 - Received a LTD sample + un-doped control from DESY
 - Will perform same SIMS analysis on these for normalization

