Abstract
Particles are one possible cause of field emission issues in SRF cavity operations. During clean room cavity preparation, several processes could contribute to the generation of particles. One of them is friction between hardware during assembly. It is important to understand the behaviors that generate and propagate particles into cavities. Using a single cell cavity, particle shedding between flanges and other materials have been tested. The number of particles is recorded with an airborne particle counter, and the generated particles are examined with microscopes. The migration of particles into a cavity due to different movements is studied. Suggestions are made to reduce particle generation and prevent contamination of the cavity interior area.

Horizontal assembly - disassembly
1.3 GHz, Tesla shape, large grain niobium, single cell cavity, ultrasonic cleaned, high pressure rinsed, air dried in cleanroom.

Vertical assembly - disassembly
Particle counter and carbon tape inside
Assemble bottom flange

Particle compositions were identified by SEM/EDS.

Cleaning seal connections
During wiping, particle counter was placed inside beam tube, same as the assembly-disassembly setup;
After wiping, cleanliness of bolt holes were checked by blowing with nitrogen gun with particle counter monitoring near each individual bolt hole;
Wiping significantly reduced particle counts of bolt holes.

0.3 µm particle counts during and after cleaning bolt holes and seal surface with alcohol soaked clean room wipe

Summary
- Particle counter inside cavity during assembly is a useful method for comparing assembly skills, but is only partially representative of real cavity assembly process;
- In the experiment, particles come from both assembly hardware and clean room environment;
- Wiping bolt holes with alcohol significantly reduces particle counts, and should be applied after disassembly when ultrasonic cleaning is not available.

Acknowledgement
Authors of Jefferson Science Associates, LLC under U.S. DOE Contracts DE-AC05-06OR23177 and DE-AC02-76SF00515 for the UCLS-II Project. Thanks to staff at the College of William and Mary characterization lab for generous help and SEM/EDS equipment. Thanks to Ari Palczewski for providing the cavity and hardware. Thanks to Chris Dreyfuss and Steve Castagnola for helping with the experiments.