

Abstract Submitted
for the 4CS21 Meeting of
The American Physical Society

Effectiveness and Reliability of UVC Sterilization For Surface Pathogens: Fluorescent Tubes vs LEDs YASH SONI, KUSH PATEL, ASHWIN SURESH, AJAY TADURI, SHREYASH PRAKASH, NIMITH GURIJALA, VISHESH AMIN, SIDDARTH JANDHYALA, PRANAV PENMATCHA, AARUSH THINAKARAN, WESLEY PENG, SRI SWAMINATHAN, HEMANTH YALAHANKA, NICOLE HERBOTS, SiO₂ Innovates/Arizona State U, UV ONE- ISIO₂ COLLABORATION — The SARS-CoV-2 pandemic creates a need for safe, reliable, fast surfaced disinfection. UVC dissociates nucleic acid bonds in DNA and RNA of pathogens thereby killing them. Disinfection by UVC is fast and effective between 254-265 nm, and safer than 180-220 nm UVC which produces toxic ozone. UVC sources include fluorescent lamps and LEDs. Cost- and energy-effective UVC Fluorescent Lamps FL use toxic Hg vapor while solid state LEDs are compact and non-toxic. This work compares the power density PD stability and effectiveness of 254 nm UVC FL and 260-280 nm LEDs. A photodetector with a sampling area of 1 cm² probes PD, while 72 hrs incubation and Colony Forming Units (CFU) counting measures pathogen Kill Rate (KR). The PD of 3 identical FL and LED sources is measured 3 X for 60 s. every 10 s., a total 54 samplings. The PD measured mid-point on 10 cm long, 1 cm wide FL tubes varies by 30% and increases by about 25% over 60 s. PD measured on 3 sets of four 0.16 mm² LED vary by 12.5% and show less than 1% variation in 60 s. The KR of FUL and LED is 99.9 99%. LEDs exhibit more reliable PD and KR.

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Date submitted: 17 Sep 2021

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