

# Air vs. Surface Contamination & Decontamination

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**EPIC**  
European Photonics  
Industry Consortium

Monday, 31 January 2022, 15:00 - 17:00 CET  
EPIC Online Technology Meeting on UV Disinfection

**Dimer**<sup>™</sup>

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# Does surface disinfection matter?

US CDC “Science Brief” April 2021:

..people are infected with SARS-CoV-2 through exposure to respiratory droplets carrying infectious virus..

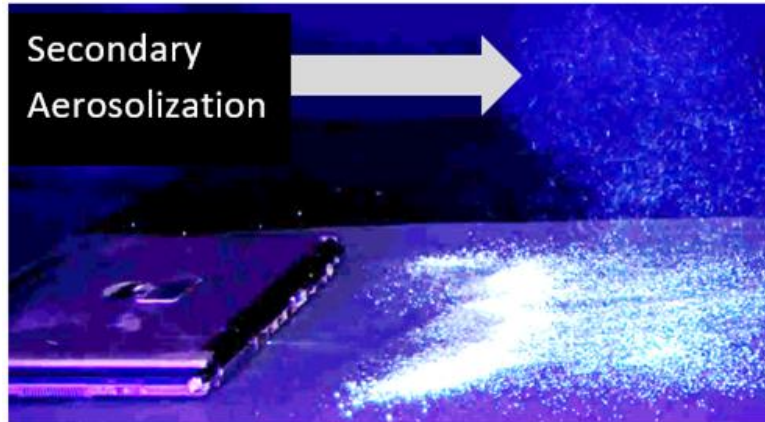
...each contact with a contaminated surface has less than a 1 in 10,000 chance of causing an infection...

# Secondary Aerosolization



Verrault, et.al. (2008):

Secondary aerosolization can occur for any virus.



## Secondary Aerosolization: Covid

**Omicron hits sanitation  
workers as garbage pick-ups  
suffer** Jan 2022



# Secondary Aerosolization: Covid

## **Covid Variants' Survival on Plastic Surfaces:**

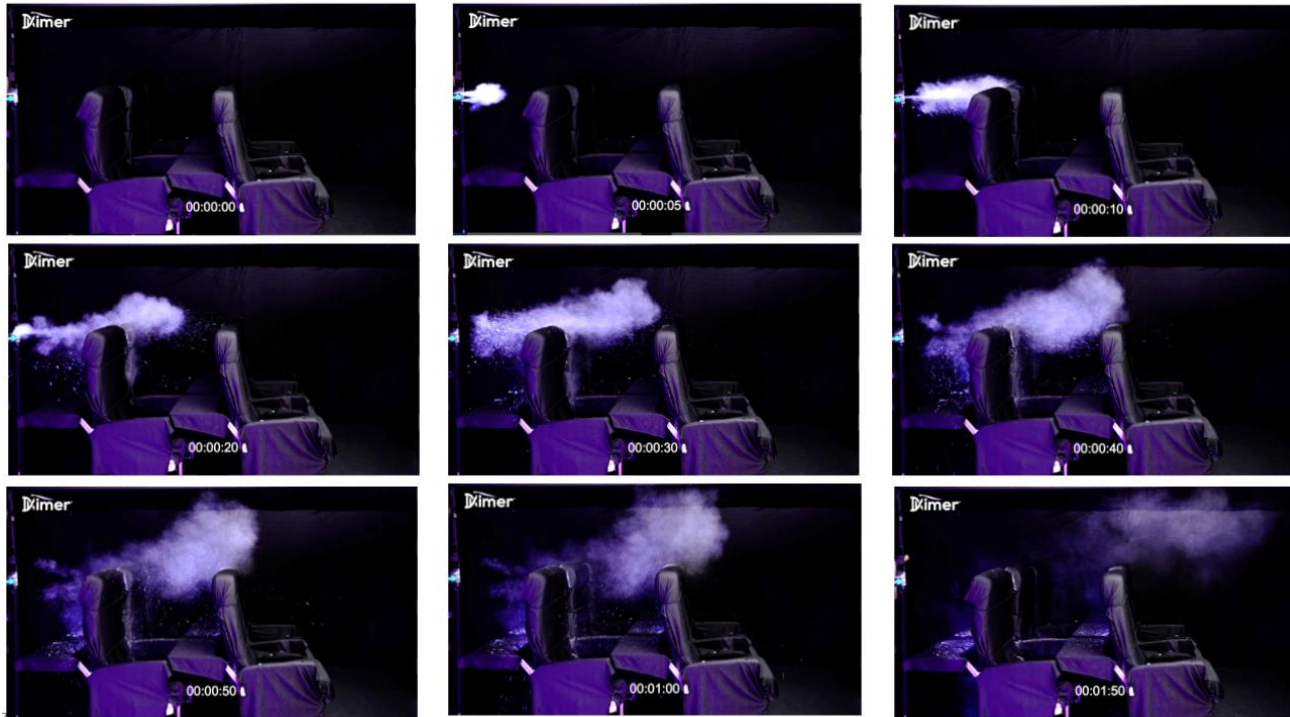
Original strain	56 hours (2.3 days)	(contagious)
Gamma	59 hours (2.5 days)	(contagious)
Delta	114 hours (4.75 days)	(very contagious)
Omicron	194 hours (8 days)	(most contagious)

(Kyoto Prefectural University 25 January 2022)



# Simulated cough in airplane cabin

Sequential Images over 1.5 seconds



**Particle size:**  
Small:  
airborne plume

Large:  
horizontal  
surfaces

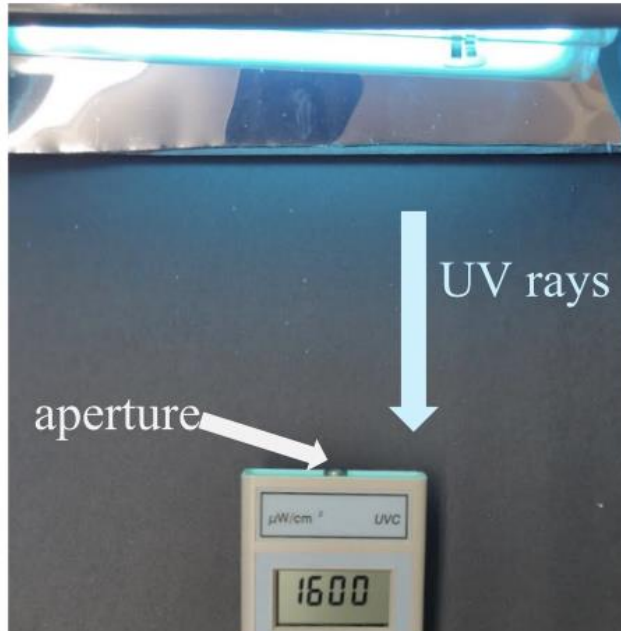
Images courtesy Dimer's advanced projects lab



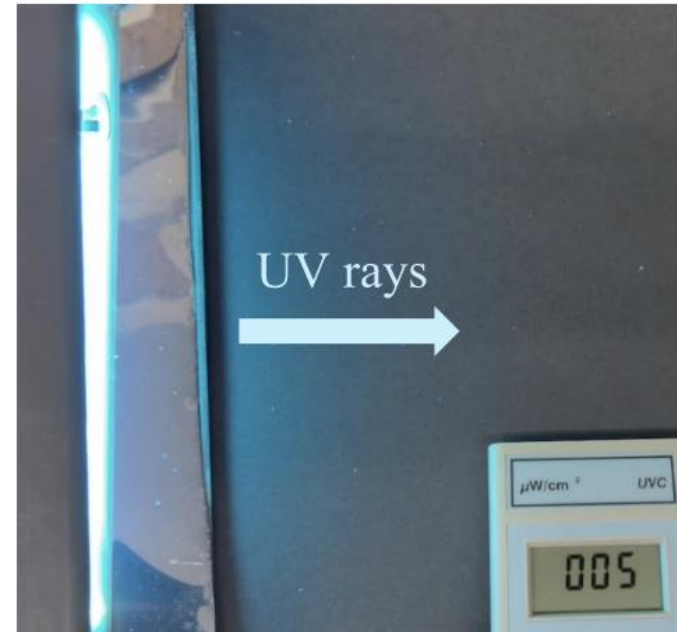
# Angle of Incidence:

Air is isotropic: direction of UVC application is irrelevant.  
Surfaces are anisotropic: direction of UVC matters-a lot.

Horizontal lamp=1600  $\mu\text{W}/\text{cm}^2$



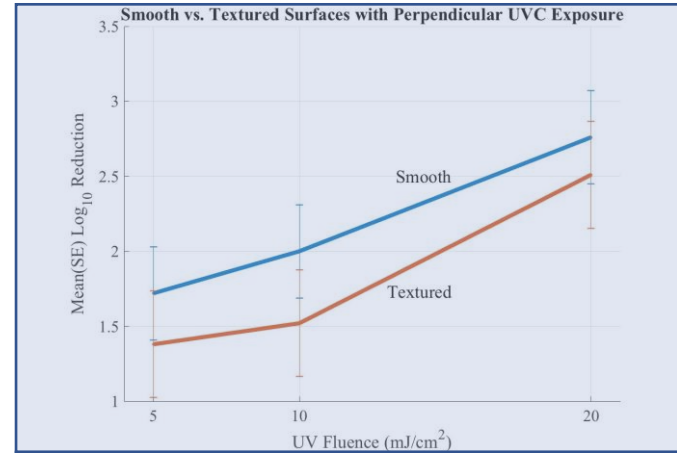
Vertical lamp



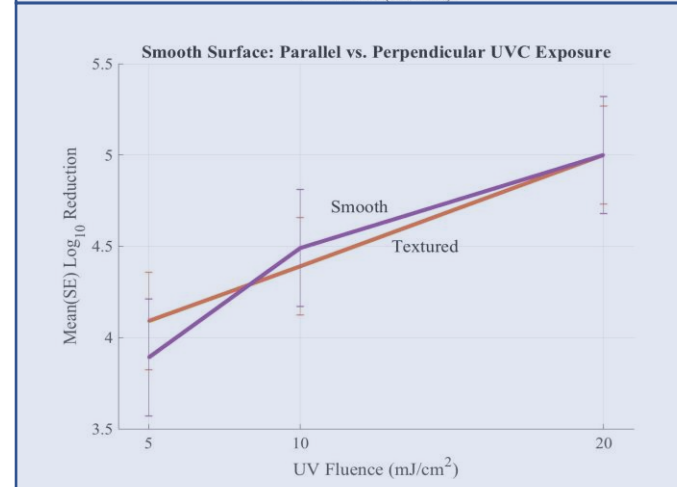
# Translates to Actual germ kill



PERPENDICULAR

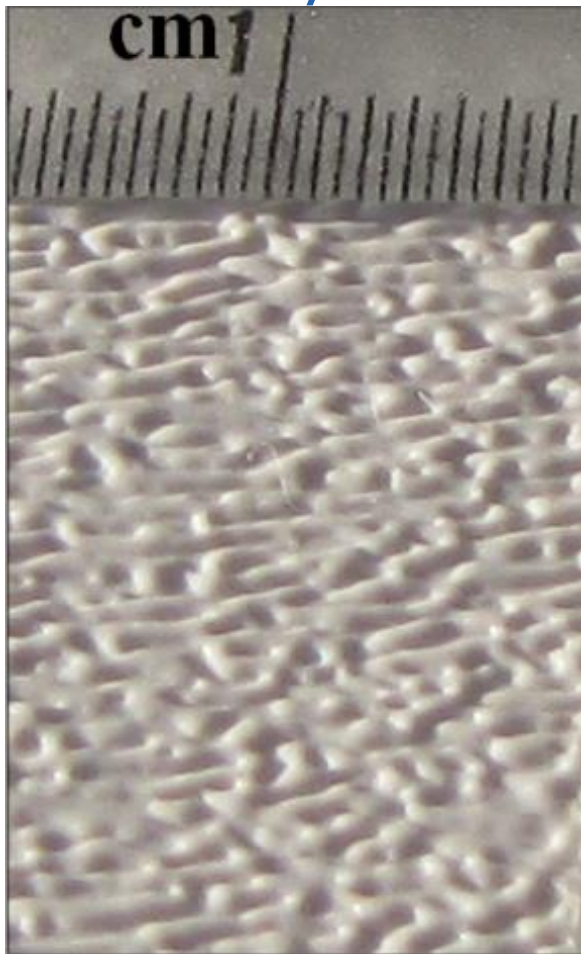


PARALLEL

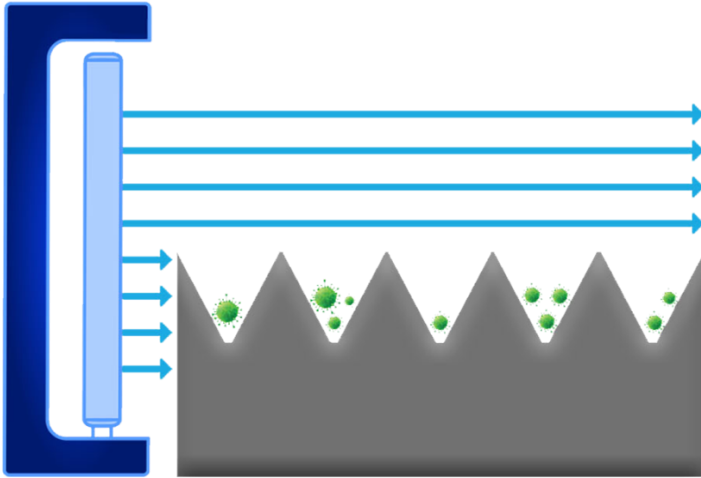




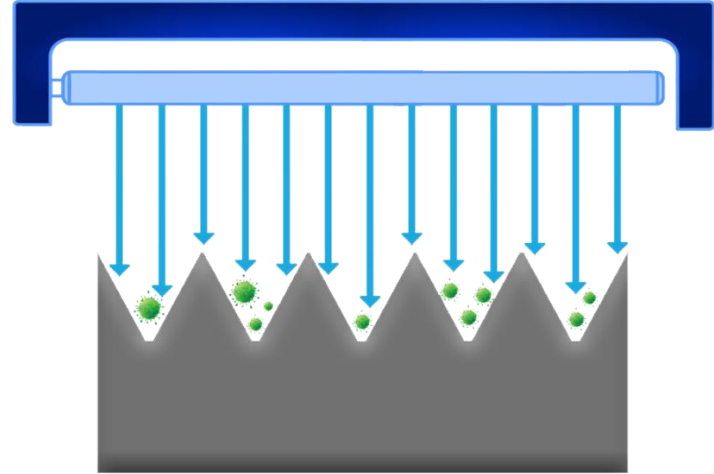
## The Canyon Wall Effect



# Canyon wall effect



Lamps Perpendicular to Surface



Lamps Parallel to Surface

Formica “valleys”: 100 microns deep (human hair diameter)

Bacteria 1.0 micron (like standing in a 200m deep canyon)

Viruses 0.1 micron (like standing in a 2000m deep canyon)

# Pulsed Xenon emitter against SARS-Cov-2

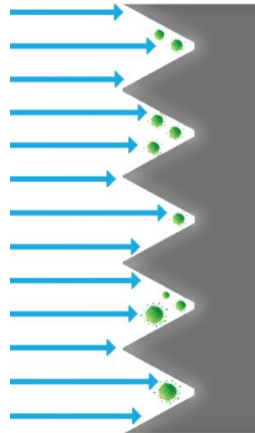
Simmons, et.al. 2021:

“...efficacy directly against SARS-CoV-2 on hard surfaces.”

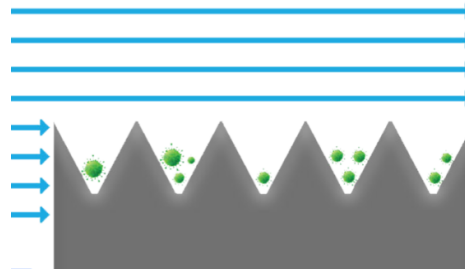
“...effective in reducing SARSCoV-2 on N95 respirators.”

HOWEVER,

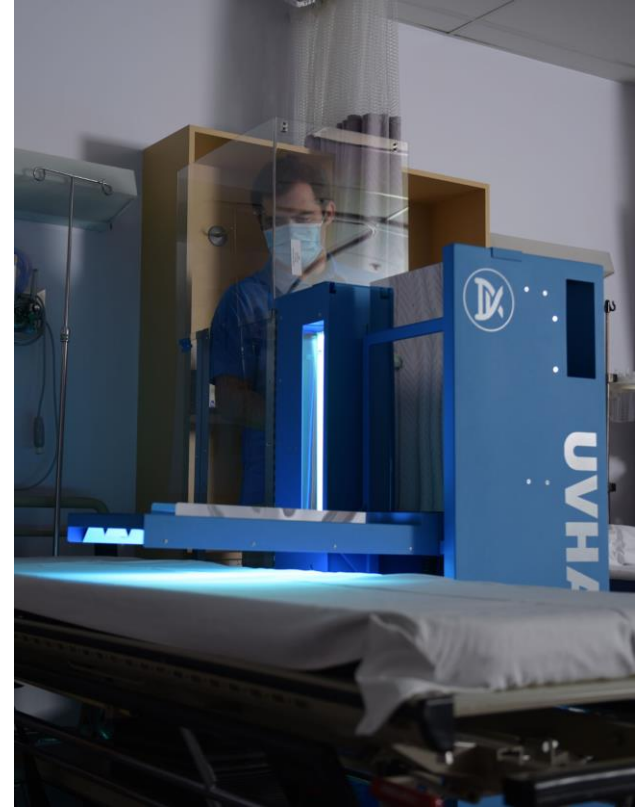
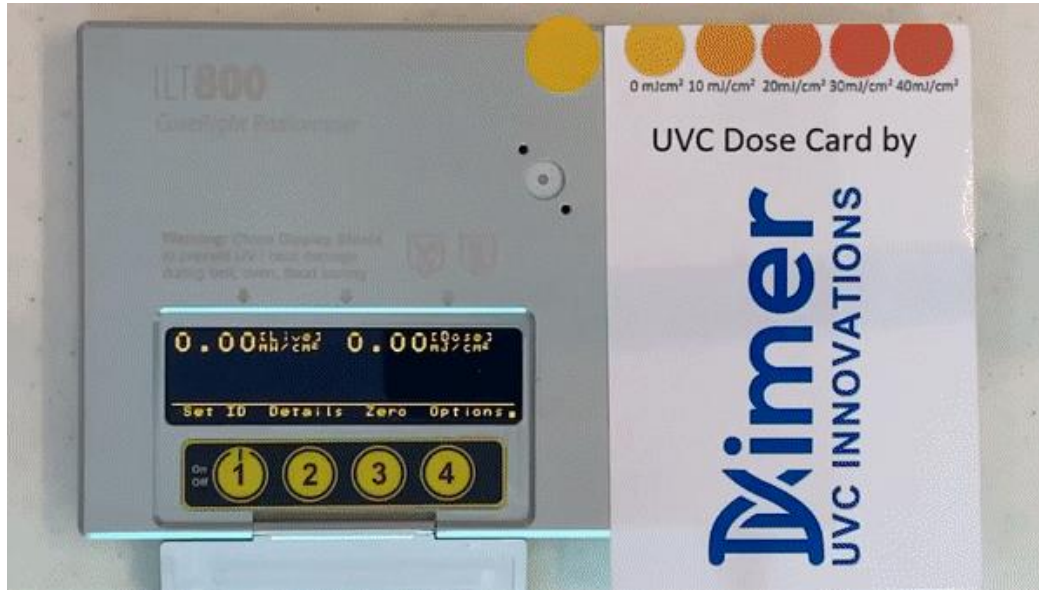
“Test surfaces were placed vertically to be parallel with the lamp...”



Report is silent regarding horizontal surfaces where microbes 50x more likely to land.



# Canyon wall & angle of incidence







## ? What's the Challenge?

Any whole-room UV device\* vs. the Dimer UVHammer - comparing efficacy testing at 50 high contamination locations\*\* in an OR or patient room - in just 10 MINUTES!

## Who's Eligible?

Any organization or facility that:

- A) has a whole-room UV disinfection device, or
- B) wants to procure a UV disinfection device.

## \$ How Do I Win?

Dimer will donate \$10,000 to the charity of your choice if your UV disinfection device outperforms the UVHammer in the 10-minute challenge.



VS



\*These or similar units

Thank you

