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Modeling Sunlight Inactivation of SARS-CoV-2 in Aerosols¹ PAOLO LUZZATTO FEGIZ, FERNANDO TEMPRANO-COLETO, UC Santa Barbara, FRANCOIS PEAUDECERF, ETH Zurich, JULIEN LANDEL, University of Manchester, YANGYING ZHU, UC Santa Barbara, JULIE MCMURRY, Oregon State University — Modeling the persistence of SARS-CoV-2 in aerosols is of paramount importance, especially as aerosols have been established as a key route for COVID-19 transmission. Recent experiments have demonstrated that SARS-CoV-2 is inactivated by simulated sunlight, with ultraviolet B (UVB) intensity assumed to be the determinant factor, since UVB affects RNA directly. Unfortunately, in sunlight, the integrated energy over the UVB range is only a few percent that of ultraviolet A (UVA), and is significant over a narrower daytime window. Intriguingly, UVA inactivation has previously been demonstrated for other enveloped RNA viruses. In this study, we use a model inclusive of both UVA and UVB to examine published data for SARS-CoV-2 inactivation. We find that a mechanism relying primarily on UVA provides better quantitative agreement with experiments. The UVA sensitivity that we deduce for SARS-CoV-2 is also in good agreement with experiments for UVA-only inactivation of SARS-CoV-1. Our analysis indicates the need for new experiments to separately assess the effects of UVA and UVB, and suggests that inexpensive and efficient UVA sources might be useful for disinfection. In addition, aerosol models for COVID-19 transmission may need to be expanded to include the inactivating effect of UVA.

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