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Fluorescence light yield and time constants of acrylic (PMMA) excited with UV light

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Rare-event searches, like those for dark matter or neutrinoless double-beta decay, go to extreme lengths to mitigate various forms of background. Acrylic (poly(methyl methacrylate) or PMMA) is frequently used as a container for scintillating liquids in rare-event searches. Weak fluorescence has been observed in certain types of PMMA at room temperature, introducing a potential source of background. Building on previous work presented at LIDINE 2019, by using the optical cryostat with large numerical aperture located at Queen's University, we quantify the light yield of the acrylic used in the DEAP dark matter search from room-temperature down to 4 K, and express it relative to the common wavelength shifter TPB. We also study the time constants involved.

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