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The MAJORANA DEMONSTRATOR's Search for Double-Beta Decay of ^{76}Ge to Excited States of ^{76}Se

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The MAJORANA DEMONSTRATOR concluded its search for neutrinoless double-beta decay in 2021. The experiment operated an array of up to 40.4 kg of germanium detectors, 29.7 kg of which were isotopically enriched in ^{76}Ge . Thanks to its ultra-low backgrounds, excellent energy resolution, and background rejection capabilities, the DEMONSTRATOR was able to execute a broad program of searches for other rare physical processes. One such process is the double-beta decay of ^{76}Ge into excited states of ^{76}Se , which has not been observed before. Six possible decay modes exist, each of which produce events spanning multiple detectors that can be separated from backgrounds. The DEMONSTRATOR previously set world-leading limits in the range of $(0.75 - 4.0) \times 10^{24}$ yrs (90% C.I.) on the various decay modes of ^{76}Ge . Since then, we have more than doubled the isotopic exposure and implemented improved analysis techniques that enable improved sensitivity. This talk will present an updated search for double-beta decay of ^{76}Ge to excited states of ^{76}Se , and will highlight searches for physics beyond the Standard Model that were conducted by the MAJORANA DEMONSTRATOR.

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Submitted on behalf of a Collaboration?

Yes

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