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From double to single beta decays –the search for the isomeric decay of $180m\text{Ta}$ in the MAJORANA DEMONSTRATOR

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In 2021, the MAJORANA DEMONSTRATOR experiment ended its search for neutrinoless double beta decay ^{76}Ge . Shown to be one of the world-leading ultra-low-background facilities we modified the experiment to search for one of the rarest isotope decays. The isotope ^{180m}Ta is the only known isotope in nature that occurs in an isomeric state instead of the ground state. The isomeric decay is spin-suppressed, and its decay has never been observed. Beyond understanding the mechanisms that play a role in its decay, the rare state can be exploited to search for dark matter (DM) through a stimulated decay. In this project, we installed clean Ta samples between the Ge detectors, and exploit the ultra-low background underground environment, the high resolution of the MAJORANA detectors, and the well-established analysis routines to search for the nuclear decay and the possible induced emission by DM. In this talk I will present the results from the first year of data taking, and its implications to the dark sector.

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Yes

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