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Status of the MAJORANA DEMONSTRATOR

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A discovery of neutrinoless double beta decay $(0\nu\beta\beta)$ would establish that neutrinos are their own antiparticles, prove total lepton number violation, and provide a mechanism for generating non-zero neutrino masses. The MAJORANA DEMONSTRATOR experiment searches for $0\nu\beta\beta$ in 76 Ge with two shielded modules of high purity germanium (HPGe) detectors, 30 kg of which are enriched to 88% in 76 Ge. The enriched detectors of the DEMONSTRATOR took data between 2015 and 2021, when they were removed for deployment in the Large Enriched Germanium Experiment for Neutrinoless $\beta\beta$ Decay (LEGEND). An upgrade of a module in 2020 with improved connectors and cabling successfully made all of its detectors operational, and it allowed the deployment of four inverted coaxial point contact (ICPC) enriched 76Ge detectors to study their performance prior to use in LEGEND. Excellent energy performance has been achieved with the DEMONSTRATOR HPGe detectors, including low energy threshold, great linearity, and a FWHM energy resolution that is approaching 0.1% at the double beta decay Q-value, the best in all $0\nu\beta\beta$ experiments. The DEMONSTRATOR has successfully demonstrated the feasibility and advantages of the ton-scale LEGEND project, and it has also been highly productive and competitive in a broad range of physics topics. In this talk, we will focus on the status of the DEMONSTRATOR's $0\nu\beta\beta$ decay result.

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