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The Search for Dark Matter and Status of the LZ Experiment

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The nature and origin of dark matter is one of the most compelling mysteries of contemporary science. For over two decades, physicists have been trying to detect dark matter particles via collisions on target nuclei, with little success to date. The LZ collaboration is in the process of finalizing the design of a massive dark matter detector, to be installed at the 4850 level of the Sanford Underground Research Facility in Lead, South Dakota. The detector will feature several tons of target nuclei and use the established liquid xenon TPC technology to achieve unprecedented sensitivity to a wide range of dark matter candidates. The experiment will reach a sensitivity to spin-independent WIMP-nucleon cross section approaching $2 \times 10^{-48} \text{ cm}^2$ in 3 years of operation. This represents an improvement of almost three orders of magnitude over current results, covering a substantial range of theoretically motivated dark matter candidates.