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CDMS-II to SuperCDMS: WIMP search at a zeptobarn

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The Cryogenic Dark Matter search experiment (CDMS) employs low-temperature Ge and Si detectors to detect WIMPs via their elastic scattering of target nuclei. The last analysis with an germanium exposure of 397.8 kg-days resulted in zero observed candidate events, setting an upper limit on the spin-independent WIMP-nucleon cross-section of 6.6×10^{-44} cm^2 (4.6×10^{-44} cm^2, when previous CDMS Soudan data is included) for a WIMP mass of 60 GeV. The improvements in the surface event rejection capability for the current analysis with an germanium exposure about a factor of 2.5 greater than used in the last analysis will be discussed. To increase the sensitivity beyond the 1×10^{-44} cm^2 benchmark new 1 inch thick detectors have been developed. A first tower consisting of six of these detectors has been successfully installed at the Soudan site. These detectors will be used in a 15 kg SuperCDMS stage with an expected sensitivity on the spin-independent WIMP-nucleon elastic scattering cross-section of 5×10^{-45} cm^2. In addition, the CDMS Collaboration has started to look for signatures of non WIMP dark matter particles, which may explain the annual modulation signature observed by DAMA.

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