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The Future of the Cosmic Frontier: Dark Matter

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The nature of the non-baryonic dark matter that is believed to dominate the matter budget of the universe is still obscure, in spite of decades of searches using increasingly sophisticated detectors. Although it might seem that every few years will yield another order of magnitude improvement in limits on dark matter interactions with ordinary matter, to be continued ad infinitum, in fact the next decade may well be the "make-or-break" time for direct searches for particulate dark matter, as proposed new experiments will begin to bump up against irreducible backgrounds from such processes as neutrino-nucleus scattering. The dark matter community is entering a critical phase in which dark matter will either be seen, or it may prove impractical to improve the limits from direct detection further. I will review the leading technologies and experimental approaches that are expected to feature prominently in this race to the finish line, and examine what hope there may be for future improvements beyond the next generation of experiments.

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