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Experiments for quantum gravity and gravitational dark matter detection DANIEL CARNEY, University of Maryland/NIST/Fermilab, SOHITRI GHOSH, University of Maryland, GORDAN KRNJAIC, Fermilab, JACOB TAYLOR, NIST — We discuss a pair of holy grail experimental goals: detection of the quantum nature of the gravitational field, and direct terrestrial detection of dark matter through its gravitational coupling to the standard model. Both goals could be achievable in the near future, leveraging the considerable progress in quantum-enhanced optomechanical/electromechanical sensing made in recent years. We will suggest some paradigmatic experimental protocols for each. In particular, we will propose a sensor array design capable of detecting any dark matter candidates with constituent mass above around $10^{18}GeV$.

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