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***Gravitational Wave Tests of Modified Gravity with Future Space and Ground-based Detectors***

The result of some of the most energetic and violent events in the universe, known as Gravitational Waves, are constantly propagating through space-time. These waves were first directly detected in September of 2015, and plans are moving forward to improve and expand the gravitational wave detectors that already exist. In particular, a design for a space-based gravitational wave detector has been submitted to the European Space Agency, with hopes that such a detector could be operational in two decades. Additionally, plans for upgrades to current gravitational wave facilities, as well as plans for new more advanced facilities, have been proposed. These future ground-based detectors will have an improved sensitivity to gravitational wave signals over ten times the sensitivity of current detectors. Using the projected sensitivity curves for the proposed instruments, both space- and ground-based, we took a theory-agnostic approach to determine how well modified theories of gravity could be tested with these future generation detectors. We have found that a combination of future ground-based and space-based detectors will provide drastically better constraints than current gravitational wave detectors can alone.