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## Optical-parametric signal-amplification for a high-frequency gravitational-wave detector

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We propose a new method beyond the standard quantum limit using an optical parametric amplification (OPA) in a signal recycling cavity (SRC) for the next generation gravitational-wave detector. This method has the advantage of improving the detection sensitivity in a high-frequency band. The OPA technique with a nonlinear crystal realizes a stiff optical spring without increasing the circulating laser power and exceeds the standard quantum limit in the high-frequency band. We have succeeded in operating the Michelson interferometer, SRC, and the intracavity OPA in our prototype experiment at Tokyo Institute of Technology. In this talk, we will present the current status of the OPA system.

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