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Stabilization of a parametric signal-amplification system using a digital signal-processing device

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A signal-recycling Michaelson interferometer with an optical parametric amplification (OPA) has a large potential for a high-frequency gravitational-wave detection. The OPA using a nonlinear crystal in the signal-recycling cavity amplifies the signal and makes a stiff optical spring. A number of degrees of freedom need to be controlled to stabilize the system. Using a digital signal-processing device, we can realize such a complex control with a single computer. We have installed a commercial digital signal-processing device sBOX2 to control the signal-recycling Michelson interferometer with an intracaviity OPA. In this poster, we explain the status of our digital control system.

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