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Low-noise preamplifier with forward biased reset for CoGeNT and MAJORANA[1] JONATHAN LEON, JASON DETWILER, DAVID PETERSON, HAMISH ROBERTSON, TIM VAN WECHEL, University of Washington, COGENT COLLABORATION, MAJORANA COLLABORATION — The CoGeNT and MAJORANA projects both make use of hyperpure Ge detectors that are in principle sensitive to very low-energy nuclear recoil signals, such as those produced by coherent scattering of dark matter particles or neutrinos from Ge nuclei. However, this sensitivity can only be realized if sub-keV thresholds can be achieved. We are developing a low-noise charge preamplifier which is continuously reset by the forward-biased gate-to-source junction of the input tetrode JFET. Similar to pulsed-reset preamplifiers, this design avoids the noise contributions of a feedback resistor, while providing the added benefit of continuous operation. To achieve the lowest possible threshold, it is imperative to reduce all extraneous sources of noise. We will discuss methods to measure and reduce noise contributions, focusing in particular on capacitor dissipation noise. We will also report on characterization and performance of our latest prototypes.

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Jonathan Leon
University of Washington

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