

Ultra-low noise, scalable, bi-polar current sources, for use as coil drivers in optically pumped magnetometers

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We present fully open source, ultra-low noise programmable current source systems, used as coil drivers for an optically pumped magnetometer (OPM) application. The devices feature a bi-directional current ranges of ± 10 mA and ± 250 mA respectively on three independent channels with 16-bit resolution. They exhibit very low noise of 30 pA/Hz and 1250 pA/Hz which translates to 2.99 ppb and 5 ppb noise over range. Both devices feature very narrow 1/f noise bandwidth of 1 Hz, enabling magnetic field manipulation for high performance OPMs.

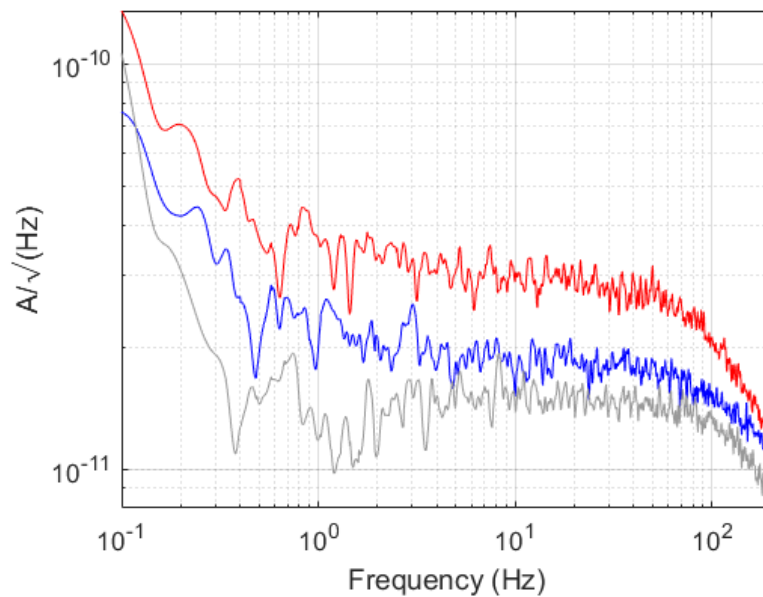


Figure 1. PSD noise result in a bandwidth of 0.1 - 200 Hz of the low current version of the coil driver. 10 mA configuration (red), 2.5 mA configuration (blue) and noise floor of the measurement setup (light grey).