

A. Additional Figures

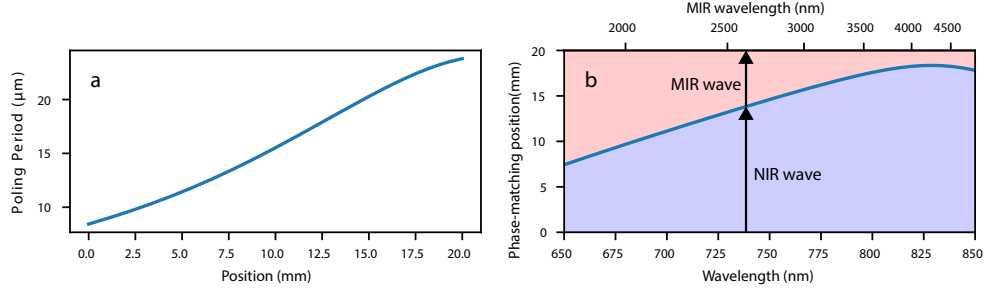


Fig. S1. Poling period and phase-matching points of the ADFG crystal: **a**, Poling period of the magnesium doped lithium niobate crystal used for the ADFG conversion process. **b**, Phase-matching points along the propagation direction in the ADFG crystal as a function of wavelength of the NIR input and the MIR output. The arrows symbolize a NIR wave propagating until the conversion point and propagating for the rest of the crystal as a MIR wave.

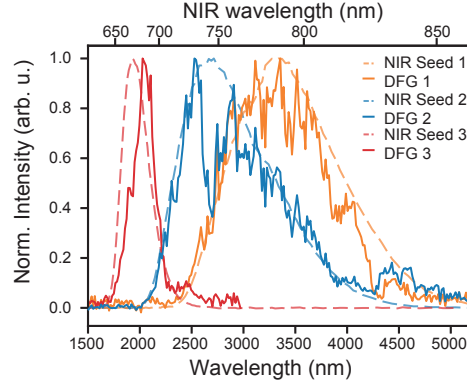


Fig. S2. Optical seed and output spectra tuning range: Spectral intensities of the near-infrared seed spectra measured on Si-CCD spectrometer and the corresponding MIR spectra measured with a PbSe-CCD spectrometer. The tuning of the center wavelength is achieved through a varied delay between pump and seed in the non-collinear OPA.

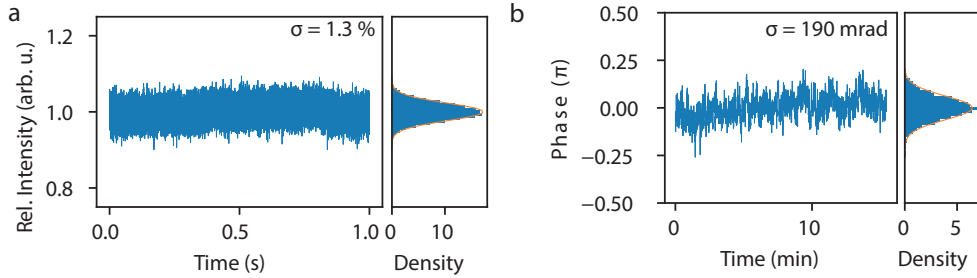


Fig. S3. Stability measurement of intensity and carrier-envelope phase: **a**) The intensity fluctuations are measured at a bandwidth of 50 kHz with an 80 kHz bandwidth mercury cadmium telluride detector over 1 s. The statistical distribution of measurement values is shown in the histogram in blue with a normal distribution fit in orange. **b**) The phase measurement is implemented by f-2f interferometry at a sampling rate of 3 Hz and an integration time of 2 ms corresponding to averaging over 100 laser shots. The statistical distribution of measurement values is shown in the histogram in blue with a normal distribution fit in orange.