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Stabilizing carrier-envelope phase of Kansas Light Source¹ CHENGQUAN LI, J.R.Macdonald Laboratory, Department of Physics, Kansas State University, ERIC MOON, ZUOLIANG DUAN, JASON TACKETT, KRIS-TAN L. CORWIN, BRIAN R. WASHBURN, ZENGHU CHANG — The Kansas Light Source is a kilohertz Ti:Sapphire laser system that produces 6 fs pulses with 0.8 mJ energy. In the past, the carrier envelope phase of the laser pulses changes randomly from shot to shot. By stabilizing the carrier envelope offset frequency of the oscillator to a quarter of its repetition rate, the fast variation of carrier-envelope phase of amplified pulses can be eliminated for over three hours. There is a remaining slow carrier envelope phase drift that was measured with a collinear f-to-2f interferometer. The phase drift was converted into a low frequency AC signal (mHz) that was sent to the phase locking electronics that controls the carrier envelope phase of oscillator. The residual drift was less than 500 mrad over 40 minutes. Variables factors that contributed to the long term phase stability are investigated. The phase stabilized pulses are used for studying attosecond pulse generation, ionization of atoms and dissociation of molecular ions at the J. R. Macdonald laboratory.

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