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Phase noise compensation in optical fiber delivery of narrow-linewidth optical frequency standard WON-KYU LEE, CHANG YONG PARK, HO SUHNG SUH, DAI-HYUK YU, SANG EON PARK, Korea Research Institute of Standards and Science — We have transferred a narrow-linewidth 1550 nm laser through a 525 m fiber network with excellent transfer stability. The fiber-induced optical phase noise during the fiber transmission broadens the laser linewidth to several kHz. We have compensated this fiber-induced phase noise by configuring a noise-canceling servo. The compensated optical phase noise has the standard deviation of 0.21 rad. There was no cycle-slip in phase noise compensation. The transfer instability was 2×10^{-17} at 1 s of averaging time. This is quite sufficient for the delivery of highly stable optical frequency standards currently available without fiber-induced noise. We have a plan to utilize this technique in building an ytterbium lattice clock.

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