A systematic study of the amplifier similariton laser will be needed to determine the limits on the pulse energy. Considering that the energy was not maximized in Ref [17], the 7-fold increase in pulse energy that we find is in rough agreement with the 3-fold increase that would be expected based on the fiber core areas difference alone. The experimental results presented here can be viewed as initial experimental data in the effort to determine the maximum performance of these lasers.

4. Conclusion

In conclusion, we have fully characterized and compressed the output of an Yb all-normal-dispersion fiber laser with an intra-cavity spectral filter. Pulse energy as high as 22 nJ is reached, and after being de-chirped, 42-fs and 10-nJ pulses are generated. Efforts in our lab will focus on scaling up the pulse energy using LMA fibers.

Acknowledgments

We thank Paul Wrzesinski from the Dantus group for his help with the initial pulse shaper setup. We are grateful for the help of W. Renninger, S. Lefrancois and A. Chong. This project has been funded by Chemical Research Instrumentation and Facilities- Instrument Development grant from the National Science Foundation CRIF:ID NSF 0923957 provided by funds from the American Recovery and Reinvestment Act of 2009. Portions of this work have been supported by the National Science Foundation (Grant No. ECS-0901323) and the National Institutes of Health (Grant No. EB002019).

#144779- $15.00USD Received 28 Mar 2011; revised 20 May 2011; accepted 22 May 2011; published 7 Jun 2011