with similar pulse duration. In another recent KLM experiment, 2.3 W were produced from an Yb:CaF_2 laser with 75 fs pulses and extracavity compression down to 68 fs. This laser, however, was not directly diode-pumped and required a diffraction limited pump beam [22].

The output power of our setup was limited by the available pump power and the non-saturable losses of the SESAM. Power scaling beyond 10 W may be possible with Kerr-lens mode-locked thin-disk oscillators, where 17 W of average output power with 200 fs pulse duration was reported using an Yb:YAG crystal [23]. Alternatively, generation of even shorter powerful pulses may require the use of a broadband gain medium such as Yb:CALGO, which was recently shown to produce 80 fs pulses at 8 W output power in a bulk configuration [24], and 62 fs pulses at 5.1 W output power in a thin-disk configuration [25].

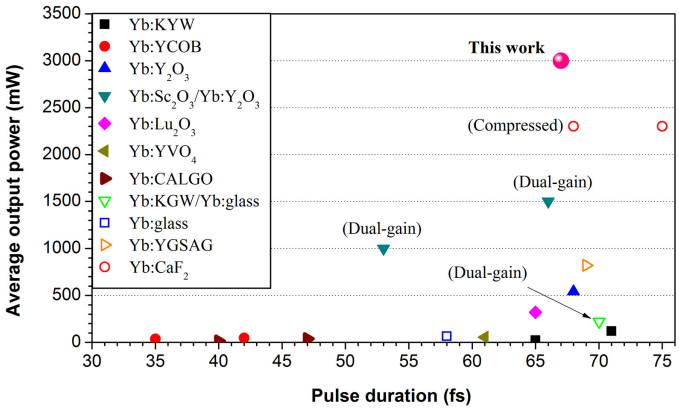

Fig. 5. Average output power of mode-locked Yb-ion bulk lasers versus pulse duration.

4. Conclusion

In conclusion, we have demonstrated a high power SESAM-assisted Kerr-lens mode-locked Yb:KGW laser. With optimized dispersion compensation, the laser delivered pulses with 67 fs duration at a repetition rate of 77 MHz. The average output power reached 3 W, which to the best of our knowledge makes it the most powerful Yb-ion bulk laser oscillator at this level of pulse duration.

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