Multi-Core Fibers for Laser, Sensing and Telecommunication Applications

Thomas Schreiber¹, Stefan Kuhn¹, Johannes Nold¹, Christian Hupel¹, Sigrun Hein¹, Steffen Schulze¹, Benjamin Yildiz¹, Denny Häßner¹, Maximilian Strecker¹, Arno Klenke², Christopher Aleshire², Albrecht Steinkopf², Cesar Jauregui², Jens Limpert¹,2, Till Walbaum¹, Nicoletta Haarlammert¹

¹. Fraunhofer IOF Jena, 2. Institute of Applied Physics, FSU Jena

We will present an overview on our research on novel multi-core fibers towards lasers and amplifiers for telecommunication, sensing as well as for scaling of coherently combined high power and high energy laser systems. We will link the required properties for the fibers to the manufacturing and characterization process chain. For sensing application, the uniformity of the individual cores will be of most interest and FBG written to the cores can serve as a measure but are also required in those applications (Fig. 1). For coherently combined systems, the multi core fibers have to show additional properties, like low cross talk and high laser efficiencies (Fig. 2).

Fig. 1: Multi-Core fiber for sensing applications.

Fig. 2: Coherent combination of ultrashort laser pulses using multi core fibers.