Amplification and carrier-envelope phase stabilization of few-cycle laser pulses

Numerous fields of sciences (from biophysics, across medical sciences to the possibility to ignite fusion, just to name a few) have already successfully utilized the use of amplified ultrashort laser pulses. If the pulse consists of only few optical cycles over its duration, then the relative position of the carrier wave compared to the pulse envelope (the so-called carrier-envelope phase, CEP) plays a very important role in the outcome of many experiments. In this cases, the CEP stabilization of the laser amplifier system becomes necessary. In my talk I will give a general overview and comparison of the most common ultrashort amplification schemes, i.e. the conventional solid-state based (e.g. Ti:sapphire) and the optical parametric chirped pulse amplification. I will also present the frequently used CEP measurement and stabilization techniques.