# Precision Control of Optical Pulse Trains

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When precisely-controlled the repetitive optical pulse train from a mode-locked femtosecond laser can be a stable reference in both time and frequency domains. Moreover, the femtosecond laser can be used to transfer the properties of frequency standard from optical-to-optical, optical-to-microwave and microwave-to-optical domains with precision that could be useful in space science. We will present results illustrating the achievable levels of control of the optical pulse train emitted by a mode-locked laser. By rigorously comparing four Kerr-lens mode-locked Ti:sapphire lasers from three laboratories, we find that the relative frequency reproducibility of the optical comb mode frequency and the associated ˜1 GHz optical pulse train can be less than 1’10-19 and 2’10-18, respectively, with confidence levels of 95%.