J-KAREN laser system

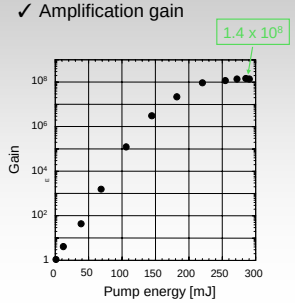
（JAEA-Kansai Advanced Relativistic ENgineering）

QuBS JAEA

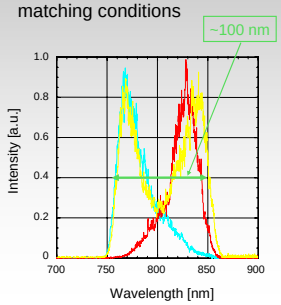
KPSI Kansai Photon Science Institute

Our OPCPA system amplifies the seed pulse to 15 mJ with an amplification gain of over 10^8 and is shown to be well suited for broad band amplification

✓ Amplification gain

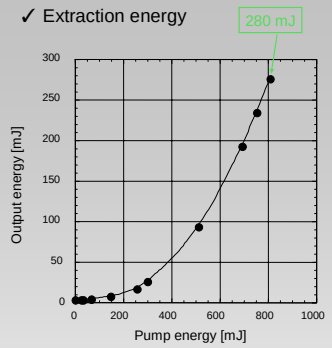


✓ Amplified spectra for different phase matching conditions



Signal pulse from OPCPA system is amplified to 280 mJ in 4-pass Ti:sapphire pre-amplifier

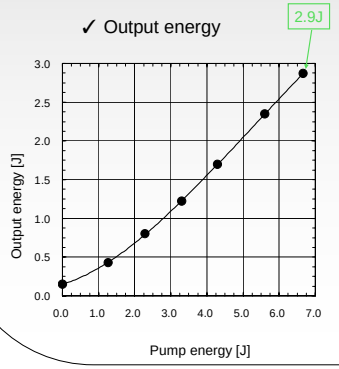
✓ Extraction energy



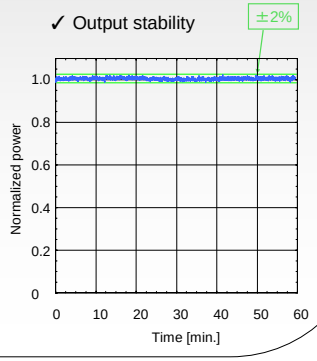
✓ Cryogenic-cooled Ti:sapphire power amplifier

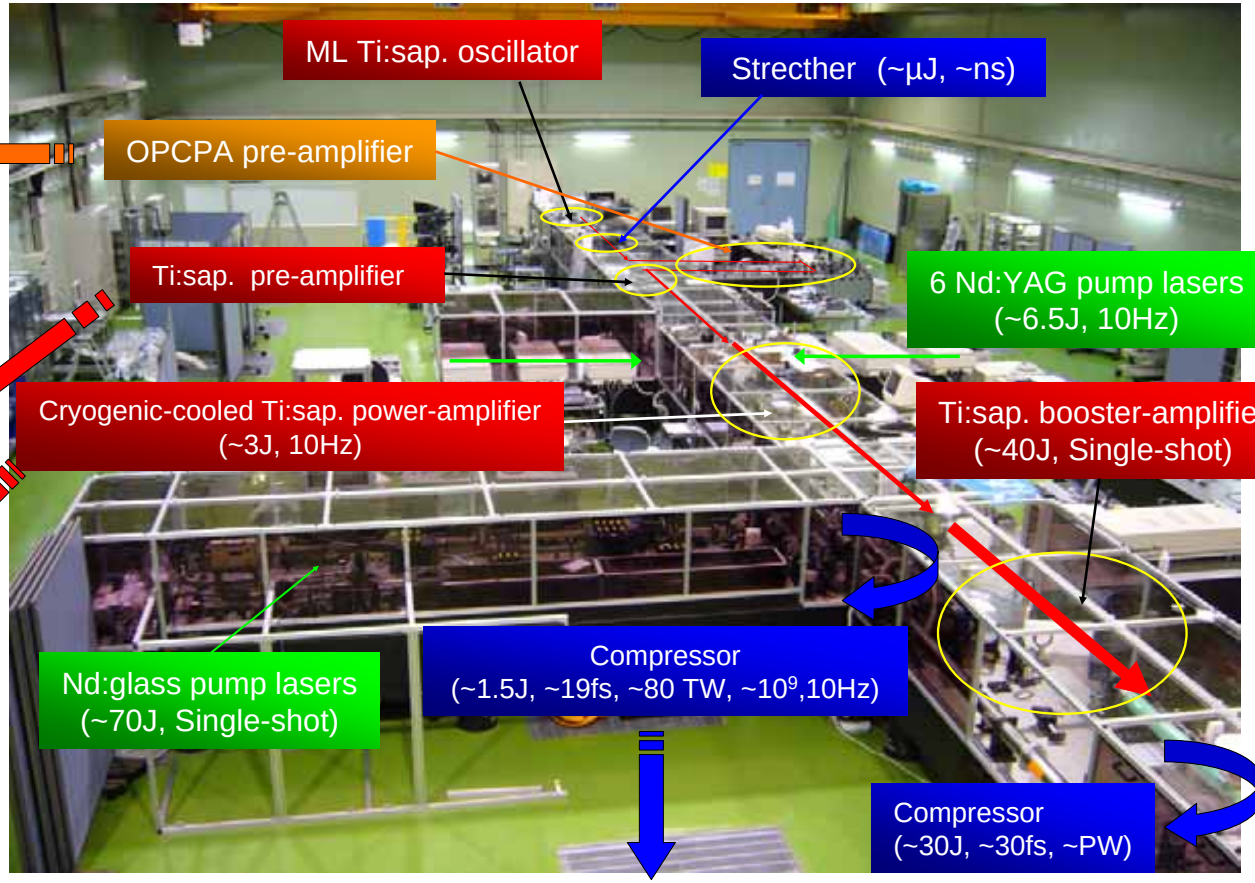
We cool the Ti:sapphire crystal in power amplifier down to below 100 K, in order to increase its thermal conductivity while reducing the dn/dt, for negligible thermal focusing

✓ Output energy



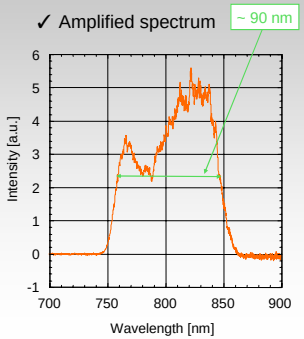
✓ Output stability



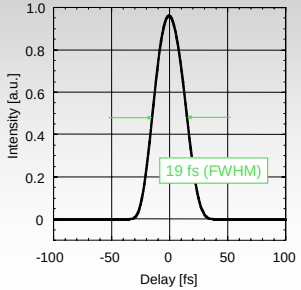


Broad bandwidth pulse is amplified and measured pulse duration is 19 fs with the energy of 1.5 J after compression, corresponding to the peak power of 80 TW

✓ Amplified spectrum

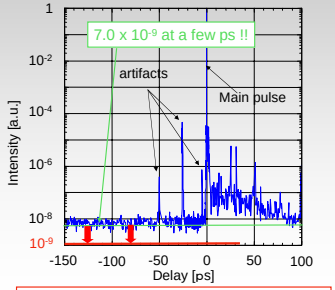


✓ Autocorrelation trace



Temporal contrast is estimated to be better than ~10^{-9} at a few ps before the main pulse with excellent beam quality

✓ Third order cross correlation



The actual contrast is found to be ~10^{-9} level

✓ Beam profile