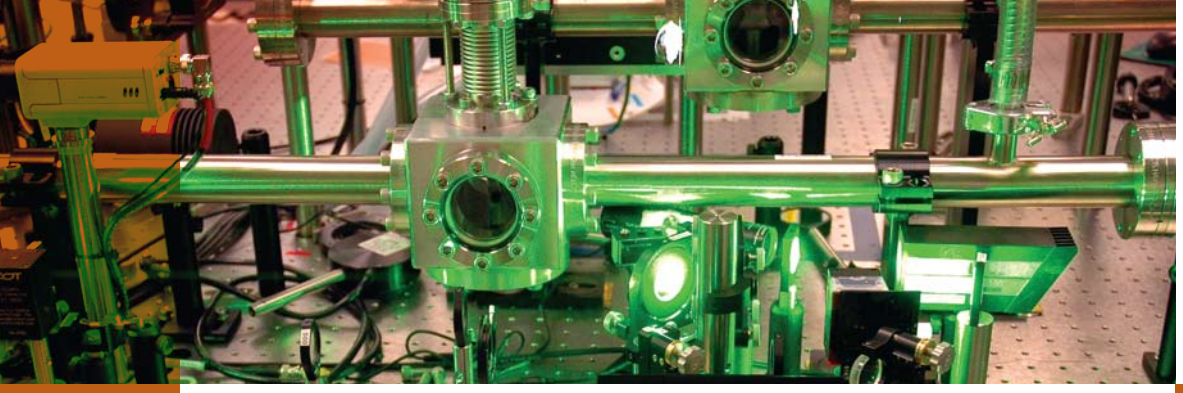
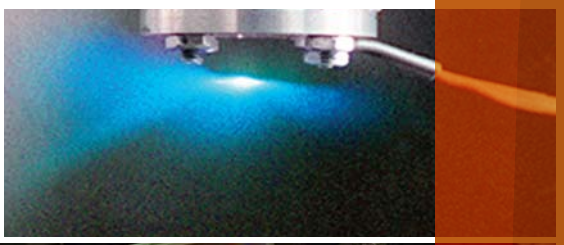
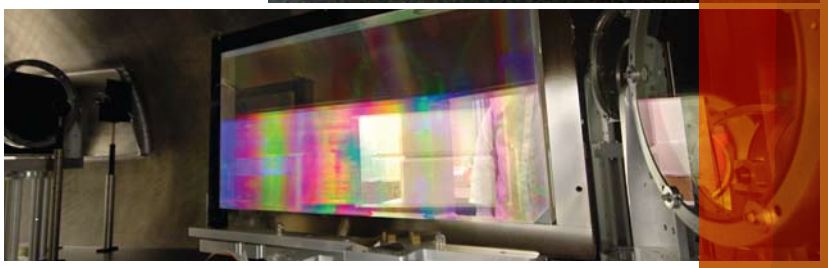


NATIONAL ENERGETICS™

HOUSTON ARCHITECTURE

The Houston Architecture is National Energetics' approach to traditional Ti:Sapphire-based CPA systems operating at 800 nm. Unlike other approaches that use regenerative or bow tie preamplifiers with Ti:Sapphire, the Houston Architecture employs broadband OPCPA. This approach enhances temporal contrast while maintaining the very short pulsewidths possible with traditional systems. This architecture is capable of yielding pulse widths as short as 25 fs with energy ranging from 100 mJ to 30 J.





800 nm
25 to 50 fs
0.1 to 30 J
OPCPA
with Ti:Sapphire

Advantages

- *OPCPA amplification with bandwidth shaping, matching the seed pulse to the amplifier train to optimize the final stage output*
- *Prepulse free amplification (not possible using regenerative amplification with switching optics)*
- *No thermal load in the gain medium, minimizing pulse distortion and eliminating active compensation requirements*
- *Pulse duration as short as 25 fs enhanced by OPCPA broadband amplification and bandwidth shaping*
- *Modular design, scaleable to higher energy of over 1 PW with additional power amplifiers*

Modular Design

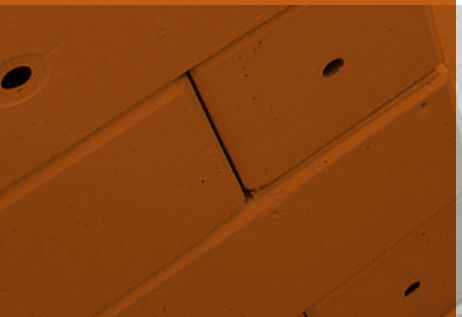
The Houston Architecture consists of four major components:

Pulse Shaping: The initial seed pulse is taken from a standard Ti:Sapphire femtosecond oscillator. It is boosted in energy for contrast enhancement and then stretched using a classic 4-pass reflective grating stretcher. The pulse is then optimized for minimal aberration and spatial irregularities before moving to the next stage of the system.

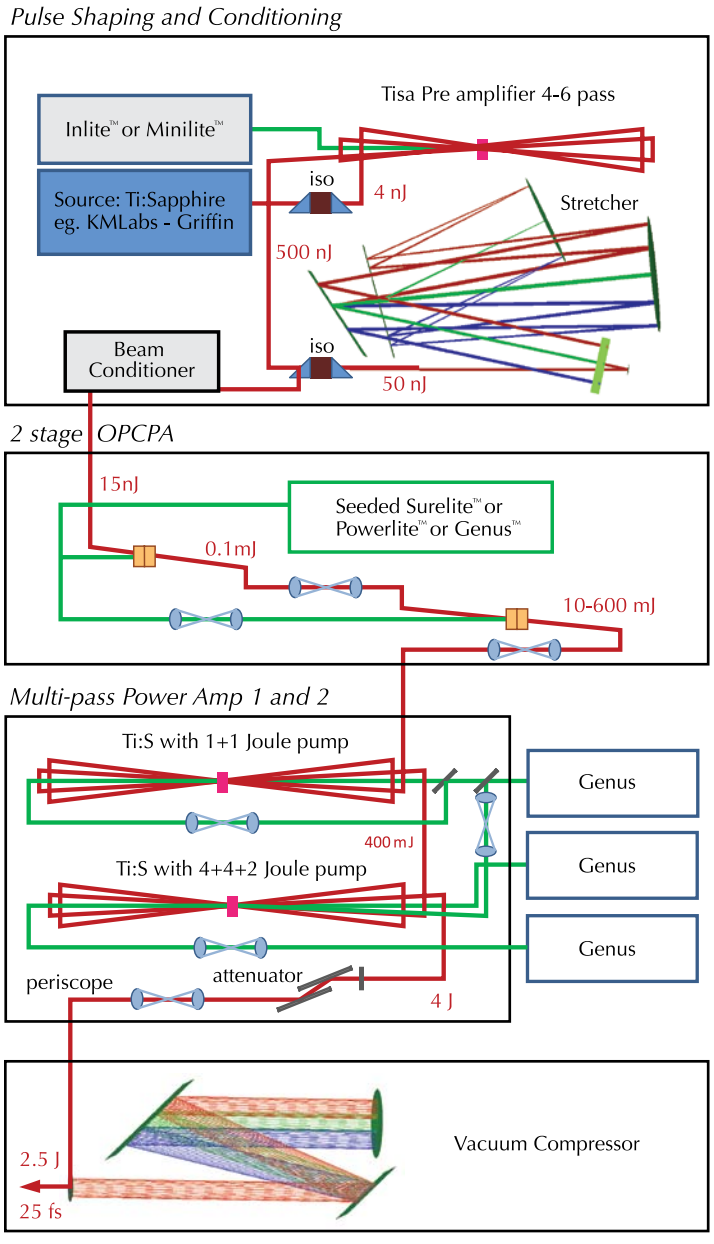
OPCPA: The OPCPA stage is unique. The seed pulse from the first stage is injected into a series of BBO crystals pumped by a spatially and temporally shaped Agilite™ laser from Continuum®. This architecture is inherently high contrast when compared to other systems employing regenerative amplification with switching optics. In addition, it is possible to spectrally shape the pulse by temporally shaping the pump beam. This can only be accomplished by using OPCPA.

Multi-stage Ti:Sapphire Amplification: The energy in the system is boosted with one or several Ti:Sapphire power amplifier stages. A variety of pump lasers are available with energies ranging from 2–12 J per beam based on user requirements and available budget. Both glass and YAG pumps can be used depending on the desired repetition rate.

Compression: The Houston Architecture uses standard gold gratings in a vacuum compressor to recompress the beam for final delivery. National Energetics is well-connected with the manufacturers of these gratings and will match the gratings to the overall system design to optimize performance.



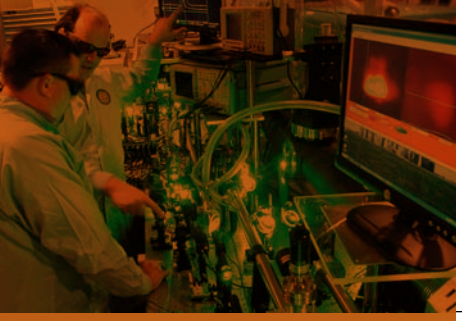
Typical Houston Architecture System



For more information on the Houston Architecture and how it can benefit you, please contact National Energetics.

Build Your System

National Energetics is a dedicated team of experts in ultra-high energy femtosecond laser system design. We are also users of these systems. We will listen to you about your research goals and help you design a system tailored to your needs. We offer our systems with Continuum pump lasers and components, and include a custom Graphical User Interface (GUI) to control them. We leverage Continuum's global service and support presence to insure you are satisfied today and tomorrow.



Your Team

National Energetics commercializes two emerging technologies that have the potential to have a large impact for you.

- OPCPA front ends offer significant advantages to classic Ti:Sapphire amplification schemes. They improve performance with better contrast ratios and no prepulse formation. The result is better data and better research.

- The Houston Architecture moves OPCPA out of the major petawatt research programs and makes it available to everyone. It is a clear improvement over traditional Ti:Sapphire amplification schemes. OPCPA is the future. It enhances performance and offers an elegant solution to problems facing today's users, including contrast ratio (prepulse suppression), compensation for thermal distortion and dispersion compensation.

We are a team of high energy laser users–and your colleagues. Our goal is to bring the highest quality and reliability, plus the best technical approach to next-generation high energy laser development. Talk to us about where you want your research to be in 10 years. We will listen and work with you to design your final system optimized for your research requirements. We will present you with a logical solution not only for today, but one that can grow with you for years to come.

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