

# Navima™ Spectroscopy System

JIREH TECHNOLOGIES & JIREH SCIENTIFIC IMAGING ARE NOW CAMLIN PHOTONICS' #1 DISTRIBUTORS IN THE U.S.

Navima™ Spectroscopy System, Modularity is Key

## Modularity

The *Navima™* Spectroscopy System has been designed to be wholly modular. Choose focal length, one or more input and output ports to use, diffraction gratings, slits (fixed, manual or motorized), shutters, CCD array ports, filter wheels, filters, fiber optics, liquid light guide adaptors, gold coated optics etc. We maximized the potential benefits of the system! Furthermore, a fully integrated software, *ilustra™*, includes all necessary functionality to drive the monochromators, cameras, and accessories, ensuring a truly 'plug and play' approach.



## Light Sources

The *Navima™* Light Source optical designs utilize high performance optics to maximize the light collection efficiency and output and only use high stability power supplies and bulbs. Mechanically, our lamps have easy to use alignment adjusters to allow for simple coupling of the light into other optical equipment such as optical fibers and monochromators etc.

Safety is paramount to us. For example, safety interlocks in our lamp housing ensure the xenon lamp cannot be switched on without the housing cover in place. A cooled housing ensures safe to touch enclosure even after many hours of operation for those lamps which normally generate significant heat.

## Key Features:

- Choice of light sources for your needs:
- Xenon short arc lamp
- Tungsten Halogen
- Highly stable power supply for maximum light stability
- Optimized to provide maximum light collection efficiency
- Modular design for straightforward integration with other spectroscopy instrumentation
- Innovative cooling design for Xenon and Tungsten lamps to ensure safe operation

Source	Spectral Range	Power	Comments
Xenon (continuous)	200 to 2500 nm	75 to 450 W	<ul style="list-style-type: none"><li>• DC short arc lamp with broad spectrum from UV to IR</li><li>• High brightness continuum emission in UV to very near IR with sharp line structure superimposed</li><li>• Colour temperature of circa 6000K</li><li>• Commonly used for solar simulation and photovoltaic quantum efficiency measurements due to "sun like" emission spectra</li></ul>
Xenon (pulsed)	200 to 2500 nm	5 to 60 W	<ul style="list-style-type: none"><li>• Microsecond pulse length providing virtually instantaneous high peak output</li><li>• Up to 1000 times brighter than continuous source over pulse length</li><li>• Commonly used in time-resolved experiments</li></ul>
Tungsten Halogen	350 to 4000 nm	50 to 150 W	<ul style="list-style-type: none"><li>• Smooth broadband emission from visible to short wave infrared</li><li>• Their low cost and wide spectral range with a smooth spectral emission make them an ideal source for many absorption, reflection, or colour measurement applications</li></ul>

# Navima™ Spectroscopy Xenon Light Sources

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## Xenon Light Sources

JSI partnered with Camlin Photonics to introduce the *Navima™* Series of Xenon light sources that offer the highest flux density, short of a laser, and are commonly used in applications requiring high brightness in the ultraviolet, visible and near infrared ranges.

One of the best sources of high brightness UV (220nm) to very near infrared (ca.900nm) light is a Xenon short arc lamp. High pressure Xenon lamps produce a continuum emission spectrum with some fine structure superimposed. This optical output can extend well into the infrared region with high flux densities.

The spectral output closely resembles that of the solar spectrum because most Xenon arc lamps have arc temperatures around 6000K and as such make ideal solar simulators.

Each lamp housing uses a XYZ placement of the bulb for optimum alignment as well as a rear reflector that improves light collection by at least 30%. The lamp housing comes with fused silica condenser optics that can be set to produce collimated or focused output. Both pulsed and continuous Xenon lamps available.



## Xenon Features

- Broadband ultraviolet to near infrared spectral output
- Very high luminance (point light source)
- Fused Silica condenser lens and rear light reflector to enhance light collection
- High stability power supply offers light stability of up to  $\pm 0.1\%$
- Optical axis height: 150 mm
- Collimated beam diameter of 50mm
- Minimum spot diameter:  $\leq 8$  mm
- Multi-port output option
- Integrated high voltage ignitor and built-in trigger to avoid HV transmission between light source housing and power supply
- Color temperature: 6000 K
- Innovative fan cooling design ensures stable lamp operation and cool enclosure
- Safety interlock and thermal sensors
- Adaptors for a range of collimation and focused outputs

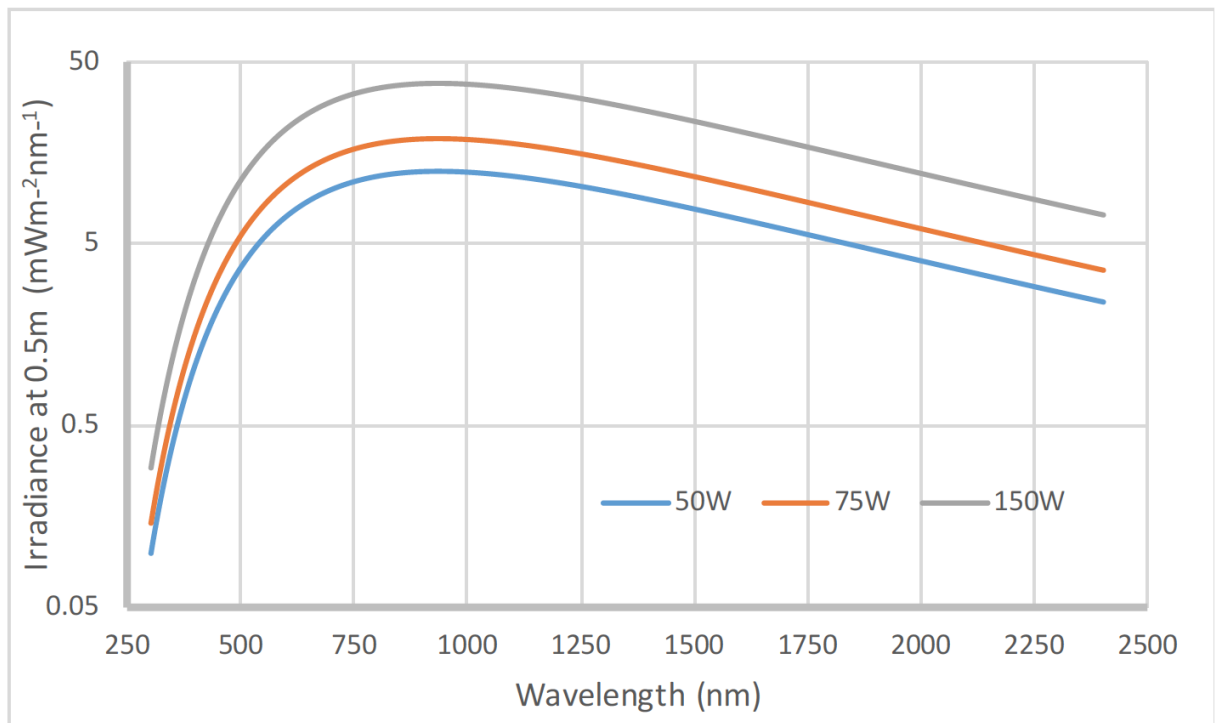
# Navima™ Spectroscopy Tungsten Light Sources

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## Xenon Light Sources

Navima™ Series Tungsten halogen lamp systems are a popular optical source for visible to infrared light as they provide a smooth blackbody spectral curve and a high output stability.

Our APOLLO T-SERIES tungsten lamps are an integrated light source consisting of cooled housing, power supply, and of course the lamp itself. The housing has been designed to allow precision adjustment of the lamp filament enabling precise positioning and coupling of the light output to, for example, optical fibers and monochromator slits.



## Tungsten Light Sources Features

- Broadband visible to infrared spectral output
- Interchangeable lamp options
- DC bulb operation with highly stable power supply (0.1% stability)
- Simple lamp alignment
- F/1 collection condenser optic
- Adaptors for range of collimation and focused outputs
- Innovative fan cooling design ensures stable lamp operation and cool enclosure
- Color temperature circa 3000-3200K

# Navima™ Spectroscopy Tuneable Light Sources

## Tuneable Light Sources

The innovative design of our light sources allows for straightforward alignment with our ATLAS monochromator-spectrograph series to produce a powerful tuneable light source system – the APOLLO TLS SERIES. With a range of light sources and monochromators available, a highly customizable tuneable light source can be created to meet your power and resolution requirements.

### TLS-SERIES

Tuneable light sources are commonly required for a wide range of optical spectroscopy applications, including for example: in physics, chemistry, biology, environmental, quantum efficiency, and spectral responsivity measurements. The innovative design of our tuneable light sources, in a fully modular yet integrated manner, allows straight forward adjustment of the configuration and accessories without the need for challenging changes to be made in order to accommodate different application needs.

The TLS series are versatile tuneable light sources of high-resolution monochromatic light from the ultraviolet to near infrared. Tuneable light sources comprise three main components: a light source, a monochromator for wavelength selection, and suitable accessories for light delivery. Every TLS we manufacture is pre-aligned, calibrated and tested as a system.



TLS300-X600 – Tuneable light source comprising a Navima™ monochromator with 300mm focal length with a X600 xenon light source. This is only one example of many custom modules.

## Tuneable Light Source Features

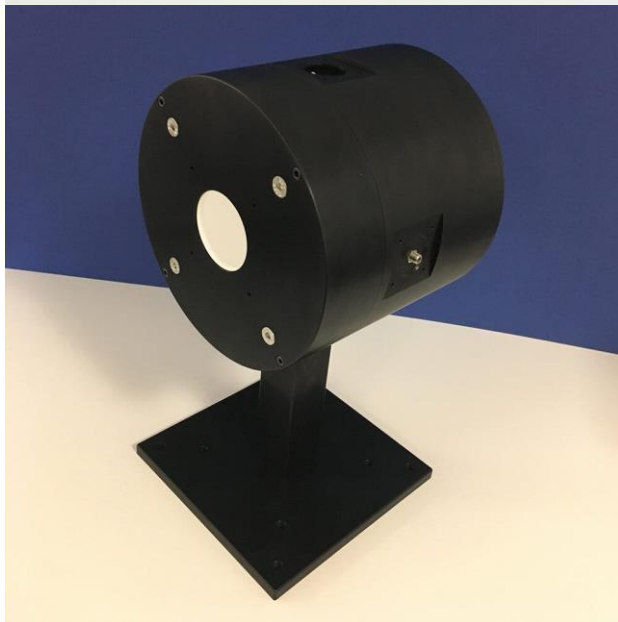
- Highly stable xenon, tungsten and deuterium light sources
- Optimized light path to maximize light output efficiency
- Pre-aligned, calibrated and tested to ensure straightforward set-up
- Output bandwidth can be adjusted continuously
- Robust and easy to use software control
- Filter wheel, shutters, optical monitors and other accessories available
- System supplied as standard on an optical baseplate

## Light Sources Available

- Continuum light sources such as xenon arc, tungsten halogen and deuterium lamps are commonly used as TLS sources and are coupled too short to medium focal length monochromators that act as tuneable wavelength selectors. The lamp and its power supply are particularly important as they define spectral range, optical stability power levels as well as the spectral smoothness of the optical emission:
- Xenon Arc Lamps: 200 to 2500nm
- Intense continuum output with some spectral lines in visible and shortwave infrared regions
- Small, high radiance arc with “sun-like” emission spectrum
- Continuous and pulsed lamp options available
- Tungsten Halogen Lamps: 350 to 4000nm
- Broad band, smooth emission spectrum with highly stable output
- Long lifetime and relatively inexpensive
- Deuterium Lamps: 115 to 400 nm
- Smooth continuous UV spectrum (above 170nm) with almost no visible to infrared light
- Shortest UV available wavelength
- Often used for UV Spectroscopy

# Navima™ Spectroscopy Accessories

Navima™ Spectroscopy System, Modularity is Key



## Spectroscopy Accessories

Jireh Scientific Imaging provide a full range of accessories to enable our range of spectroscopy instruments to be customized to your specific application requirements or to be interfaced with your existing devices. We can also integrate third party devices into our systems in many cases

The range of spectroscopy accessories includes:

- Ports for our monochromators (manual and motorized slits and CCD array ports);
- A full range of diffraction gratings;
- High speed shutters;
- Motorized filter wheels for order sorting or neutral density filters;
- Adaptors for fiber optics, fiber optic bundles, or liquid light guides;
- Detectors for the ultraviolet, visible, and infrared
- Sample chambers with various holders (including temperature-controlled holders) for liquids, solids, powders and thin films
- Integrating spheres (including PTFE)
- Custom design accessories