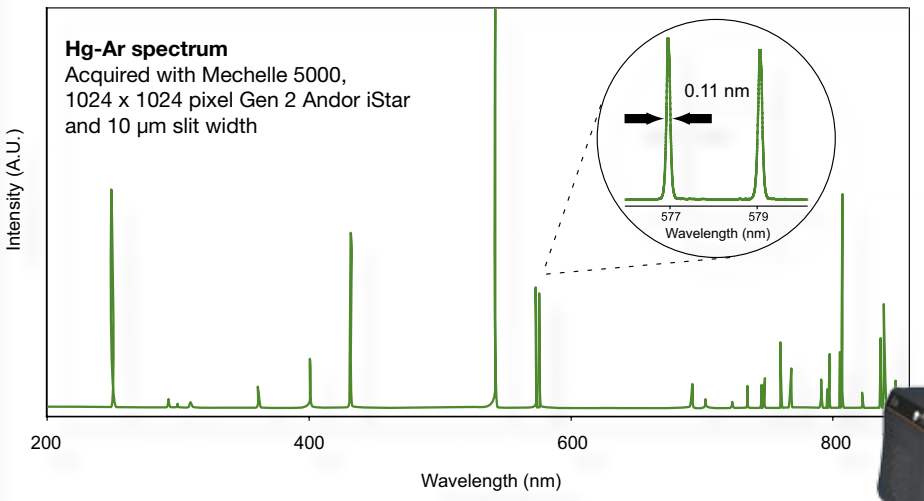
Mechelle 5000

195 mm Focal Length, 200 - 975 nm, Echelle Spectrograph

Spectroscopy



Features and Benefits

- **Compact and robust design with no moving components**
  Ideal for non-lab based applications
- **Patented optical design**
  Ensures maximum resolution and extremely low cross-talk
- **Auto-temperature correction**
  Corrects for the variation of prisms optical refractive index with temperature
- **N_2 purged**
  Enables maximum throughput in the UV region
- **Pre-aligned detector/spectrograph solution**
  Enables fast, efficient experimental set-up
- **Low F/number**
  Highly efficent light collection
- **Wide range of accessories available**
  Including fibre optics, slits, aiming Laser, collector/collimator and calibration lamps
- **Andor Solis software**
  Extracts automatically a full wavelength calibrated spectrum from a complex echelle image and offers system advanced data manipulation capabilities
- **Peak labelling with NIST table**
  Easy tagging of known atomic species at the press of a button

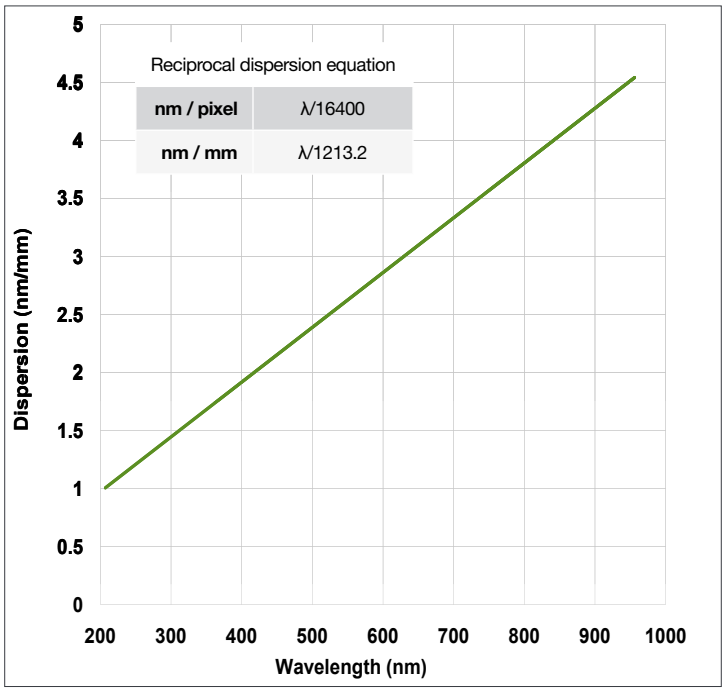
High band pass echelle spectrograph

Andor's Mechelle ME5000 spectrograph has been designed to provide simultaneous recording of a wide wavelength range (200 - 975 nm) in one acquisition. It has no moving components and is available in a pre-aligned detector/spectrometer format.
Based on the echelle grating principal, its patented optical design provides extremely low cross-talk and maximum resolution compared with other spectrographs. It is designed to operate with both Andor's DU934 camera and the New iStar DH334T intensified camera in applications such as LIBS, plasma studies.

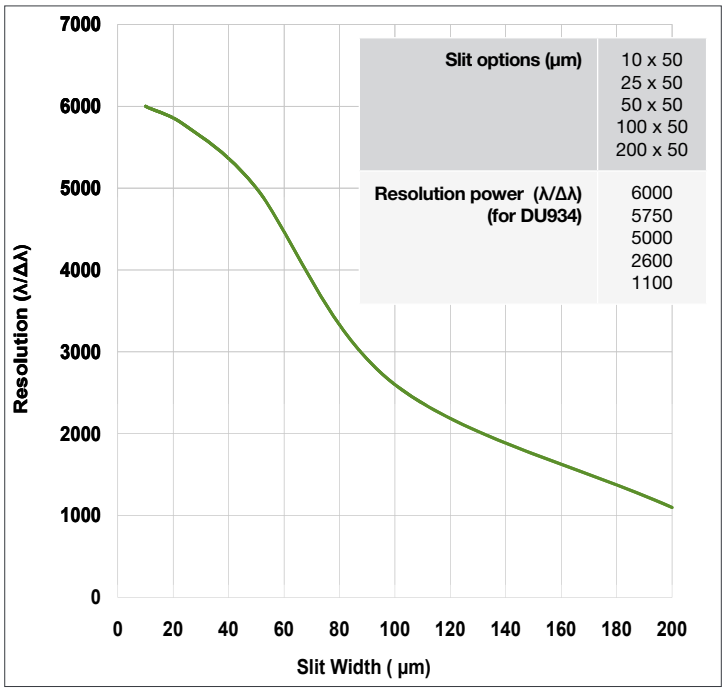
Specifications

Wavelength range (nm)	**200 - 975**
Focal length (mm)	**195**
Aperture	**F/7**
Spectral resolution (λ/Δλ) [•1] (corresponding to 3 pixels FWHM)	**Up to 6,000**
Wavelength accuracy	**Better than ± 0.05 nm**
Channel height (pixels) [•2]	**5, 3, 1**
Channel width (pixels)	**1**
Optical adjacent order cross talk [•3]	**Better than 1 x 10^{-2}**
Stray light [•4]	**Better than 1.5 x 10^{-4}**
Horizontal magnification	**0.81**
Vertical magnification	**1.66**
Shutter rate (Hz) [•5]	**1**

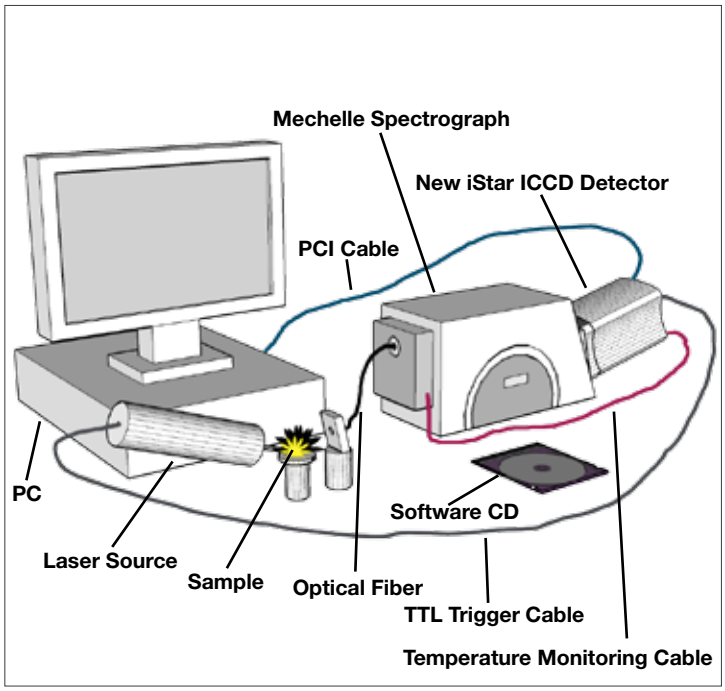
Reciprocal Dispersion



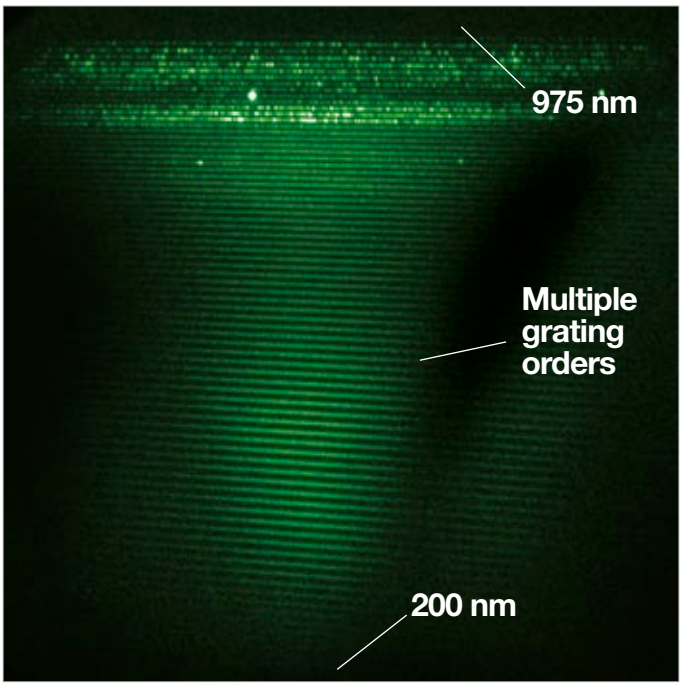
Resolution Power vs Slit Width



Typical Setup



Echellogram Example



Echellogram of Deuterium-Tungsten light source acquired with Mechelle 5000 and Andor New iStar ICCD

Creating The Optimum Product for You

How to order the Mechelle 5000 :

Step 1.

Quote the model number for the spectrograph.

Step 2.

The Mechelle 5000 comes with an SMA adapter as standard. Select entrance port accessories for relevant light coupling interfaces and calibration.

Step 3.

Select your camera.

Step 4.

Please select which software you require.

Andor New iStar, detector of choice for broadband LIBS

ME5000

Step 1.

Quote model number

Step 2.

The Mechelle 5000 is supplied with ME-OPT-8004 (Fibre optic cable, UV, SMA-SMA, 50 µm core x 2m) and an SMA adaptor, but no slit or shutter. The following accessories are available:

ACC-OCE-HG1 Mercury-Argon calibration lamp.
LK-DHRD-OCE-CAL Deuterium-Halogen lamp, radiometrically calibrated (230 to 1,050 nm).
ME-OPT-0007 UV-NIR light collector / collimator with laser module for F/# = 2 collection.
ME-SHT-9002 Mechelle shutter unit (recommended when using iKon-M DU934).
ME-SLT-25x25 Mechelle 25 x 25 µm slit *6
ME-SLT-10x50 Mechelle 10 x 50 µm slit *6
ME-SLT-50x25 Mechelle 50 x 25 µm slit *6
ME-SLT-25x50 Mechelle 25 x 50 µm slit *6
ME-SLT-50x50 Mechelle 50 x 50 µm slit *6
ME-SLT-100x50 Mechelle 100 x 50 µm slit
ME-SLT-200x50 Mechelle 200 x 50 µm slit

Step 3.

Please refer to Andor iKon-M DU934 or Andor iStar DH334T specification sheets for choice of range of sensitivity ranges and time-resolved capabilities.

Step 4.

The Mechelle 5000 requires at least one of the following software options:

Solis for Spectroscopy A 32-bit application compatible with 32 and 64-bit Windows (XP, Vista and 7) offering rich functionality for data acquisition and processing. AndorBasic provides macro language control of data acquisition, processing, display and export. Control of Andor Shamrock spectrographs and a very wide range of 3rd party spectrographs is also available.

Mechelle SDK A software development kit that allows you to control the Andor range of cameras from your own application. Available as 32 and 64-bit libraries for Windows (XP, Vista and 7). Compatible with C/C++, C#, Delphi, VB6 and LabVIEW.

Have you found what you are looking for?

Need flexibility on resolution and bandpass? **The Shamrock Czerny-Turner-based series offer an interchangeable triple grating turret interface.**

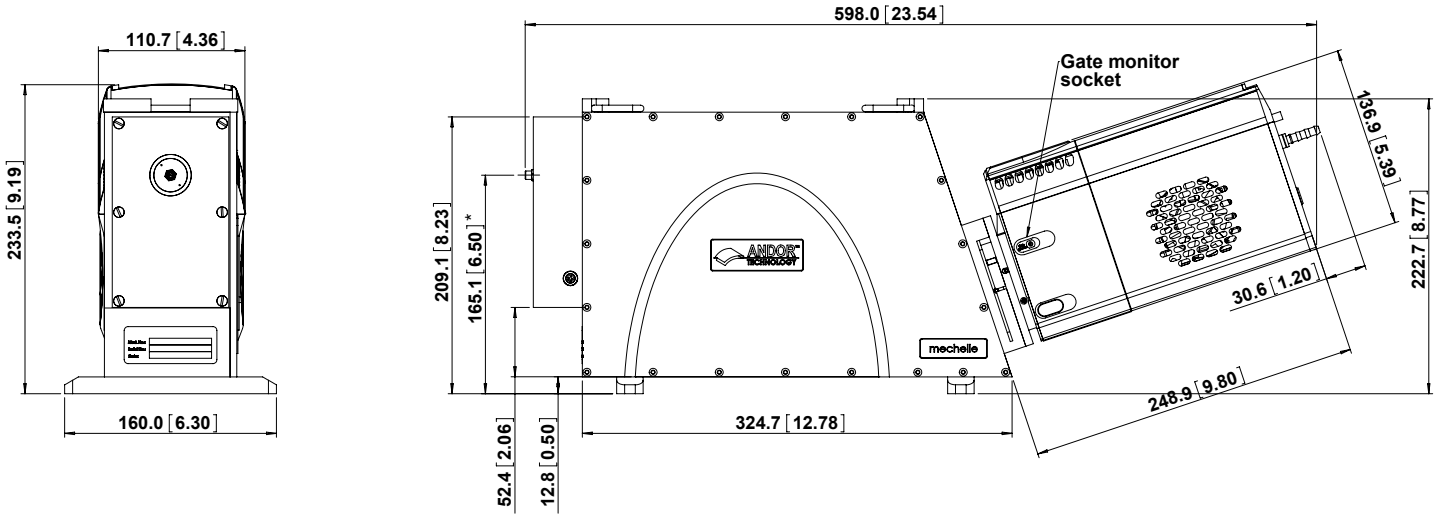
Need higher resolution? **The Shamrock 500i and 750 offer 500 & 750 mm focal length respectively and a choice of high density gratings.**

Need simultaneous acquisition of several light sources? **The Shamrock 303i and 500i boast aberration-corrected toroidal optics, for high-definition multi-track Spectroscopy.**

Need a customized version? Please contact us to discuss our Customer Special Request (CSR) options.

Product Drawings

Dimensions in mm [inches]



* The optical path height of the Mechelle with feet attached. Without feet the optical path height is 155.1 mm [6.1"]

Screw Type Requirements	
Camera attachment to CCD flange	4 off, 6/32 x 3/8 UNC

Weights:

- Standalone = 10 kg [22 lb]
- With New iStar camera attached = 14.2 kg [31 lb 4 oz]

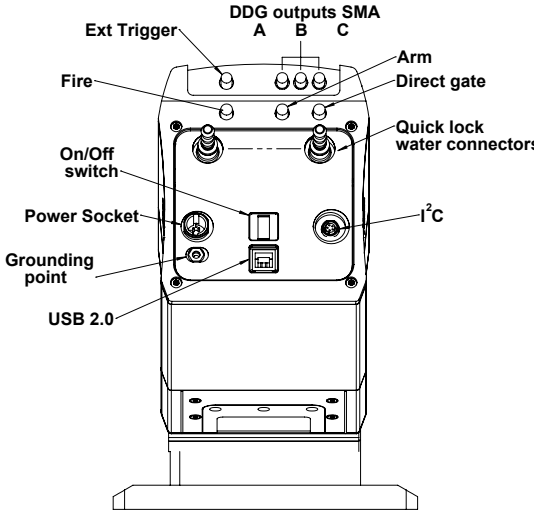
Connecting to the Mechelle 5000

Camera Control

Connector type: Dependant on type of camera attached

Temperature Correction & Optional Shutter Control

Provides I²C bus, 5V, TTL signal for shutter



Rear view showing New iStar camera connections

Applications Guide

Laser Induced Breakdown Spectroscopy (LIBS)	✓
Plasma Studies	✓
Chemical Detection	✓
Environmental Analysis	✓

✓ = Suitable

✓ = Optimum

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Tokyo
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Fax +81 (3) 3518 6489

North America
Connecticut, USA
Phone +1 (860) 290 9211
Fax +1 (860) 290 9566

China
Beijing
Phone +86 (10) 5129 4977
Fax +86 (10) 6445 5401

Items shipped with your spectrograph

1x CD containing Solis software
1x I²C, shutter & temperature cable
1x SMA adapter
1x ACC-ME-OPT-8004, 50 µm core, UV-enhanced fiber optic

Footnotes: **Specifications are subject to change without notice**

1. The spectral resolution is measured using an Andor DU934 camera. This value is equivalent to a FWHM of 0.04 nm at 200 nm or 0.1 nm at 500 nm, measured using a 50 µm wide slit. When used with a DH334T the typical spectral resolution is 4000.
2. The channel height is selectable through the software.
3. Cross talk measured with a 50 x 25 µm slit at the 546 nm line, with a channel height of 5 pixels.
4. Stray light as measured at 20 nm from a 633 nm laser line.
5. The shutter is optional when using the Mechelle with Andor's New iStar intensified CCD camera. However it is recommended to protect the image intensifier photo-cathode from photo-bleaching during experimental 'dead-times'.
6. When working with narrow slits (< 50 µm), use of a larger core diameter fiber optic is strongly recommended, i.e. 100 or 200 µm.

Operating & Storage Conditions
Operating Temperature 20°C to 30°C ambient
Relative Humidity < 70% (non-condensing)
Storage Temperature -25°C to 50°C

SMechelleSS 1111 R3