

Precision and Vacuum Technology



PREVAC EA15 HEMISPHERICAL ENERGY ANALYSER

A new direction in the advancement of surface science research

PREVAC EA15 hemispherical energy analyser is intended to provide high-resolution PES measurements to be analysed in a 150 mm mean radius assembly. It is wrapped in a shield constructed of two parallel mu-metal plates guaranteeing adequate analysis conditions for low- and high-energy photoelectrons. Equipped with a total number of 11 slits, the analyser offers the possibility to choose between best energy resolution and best intensity. According to given photoelectron energy the analyser is set up with up to 8 predefined PE to satisfy customer's requirements.

DETECTORS

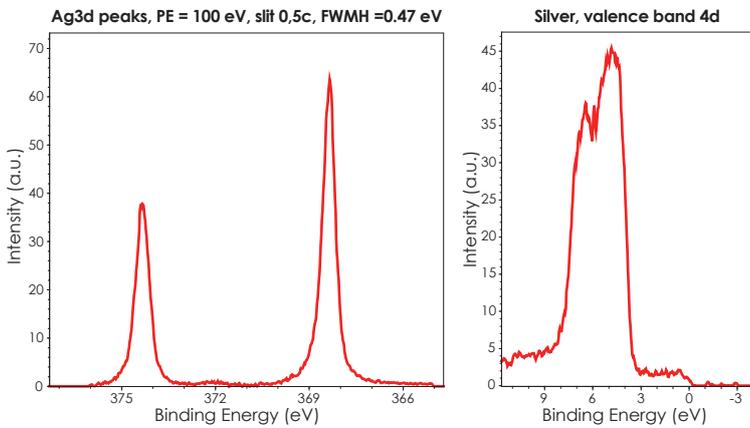
- **CCD-MCD detector**
 - 40 mm diameter dual MCP detector
 - 656 energy channels available simultaneously
 - 494 angular channels available simultaneously
 - 90 fps
- **DLD detector**
- **Channeltron detector**

ANALYSER PACKAGE

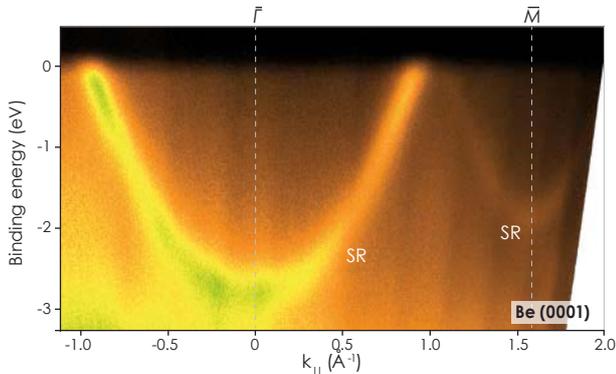
- The analyser package includes:
- **EA15** hemispherical energy analyser
 - **RUDI-EA2** high stable and low noise electronics
 - **SPECTRIUM** acquisition and analyser control software



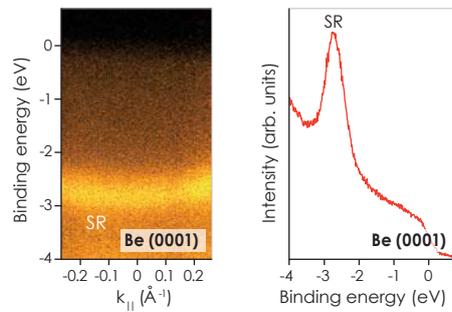
Spectra of silver, obtained by EA15 analyser and X-ray source with monochromator RMC50, excitation AlKα 1486,74 eV



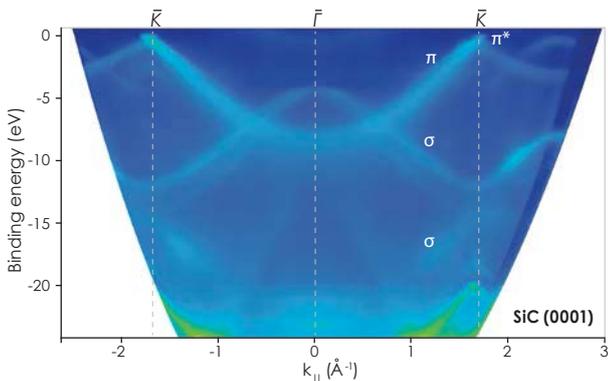
The investigation on the electronic structure of different crystals are presented using angle resolved photoelectron spectroscopy (ARPES) with a non monochromatized He plasma source.



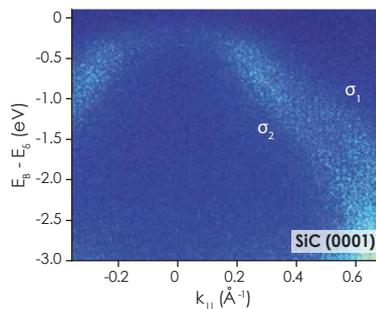
The electronic band structure along $\bar{\Gamma}\bar{M}$ direction for the $h\nu=21.2$ eV at room temperature.



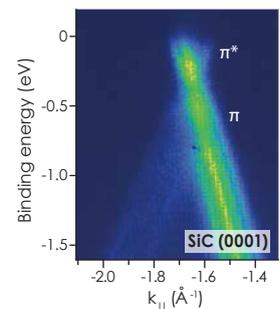
Surface state band dispersion around $\bar{\Gamma}$ point for $h\nu = 21.2$ eV with EDC profile.



The electronic band structure along $\bar{\Gamma}\bar{K}$ direction for the $h\nu=40.8$ eV at room temperature.



Dispersion of the σ band around $\bar{\Gamma}$ point for $h\nu = 40.8$ eV.



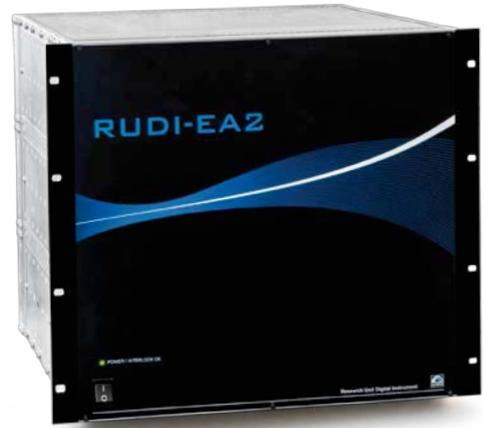
Multilayer graphene with four π -band branches together at \bar{K} point

Note: The use of a mu-metal analysis vacuum chamber or an inner mu-metal shielded chamber in combination with PREVAC EA15 analyser is recommended in order to minimize influence of external magnetic fields and to maximize performance of the analyser.

RUDI-EA2 ELECTRONICS

Being part of the analyser, the **PREVAC RUDI-EA2** (Research Unit Digital Instrument) ultra stable high voltage electronics lead to reliable measurements which not only serve to control voltages on lens elements, but also the detection part with a modern 2-D low noise CCD-MCP assembly with a noise level of <math><0.01 \text{ cps/channel}</math> (optional detectors coming soon).

Temperature stability	<math>< 0.5 \text{ ppm/}^\circ\text{C}</math>
Noise	<math>< 400 \mu\text{V}</math> at 100 V Low Energy Range
Drift	<math>< 20 \text{ ppm/year}</math> (typical 10 ppm/year)
Electric isolation	6 kV
Min. step size HV100	1.6 mV
Min. step size DAC	200 μV
DAC Bits	16
Communication	MODBUS-TCP 460 Kbit/s
Independent calibrated modules	



- Rapid temperature stabilisation
- 16bit AD converters
- Up to 6 kV power supplies
- Variable configuration

SPECTRIUM SOFTWARE

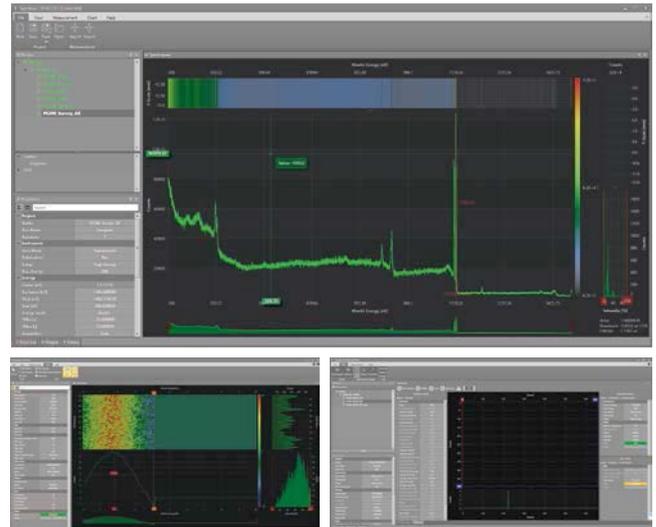


The analyser is delivered with modern **PREVAC SPECTRIUM** software for data acquisition and analyser control. A progressive and optimized software tool in regard of handling and a very intuitive graphical interface.

The software offers the possibility to define single independent regions as well as grouping them in sequences. Also lodging sequences in major sequences is supported. To prevent loss of track each region or sequence can be added by a marker with additional user descriptions even while measurement is in progress.



- Interactive scan control
- Experimental automation modules
- Advanced 2D and 3D spectroscopy
- Compatible with **TANGO** control systems
- Modern and user friendly interface
- High quality spectra



Measurements can be done in Fixed and Scan mode and in both cases while processing, measurement tools and FWHM display are available. In addition, not only a real-time view of the detector image in 3D as well as energy graph, but also a graph of the 2D detector image and the possibility to filter a chosen intensity range are at user's disposal. Intensity graph is shown along geometry axis. In order to guarantee compatibility to existing software data export to CSV, Excel, Igor and CasaXPS is available by default.

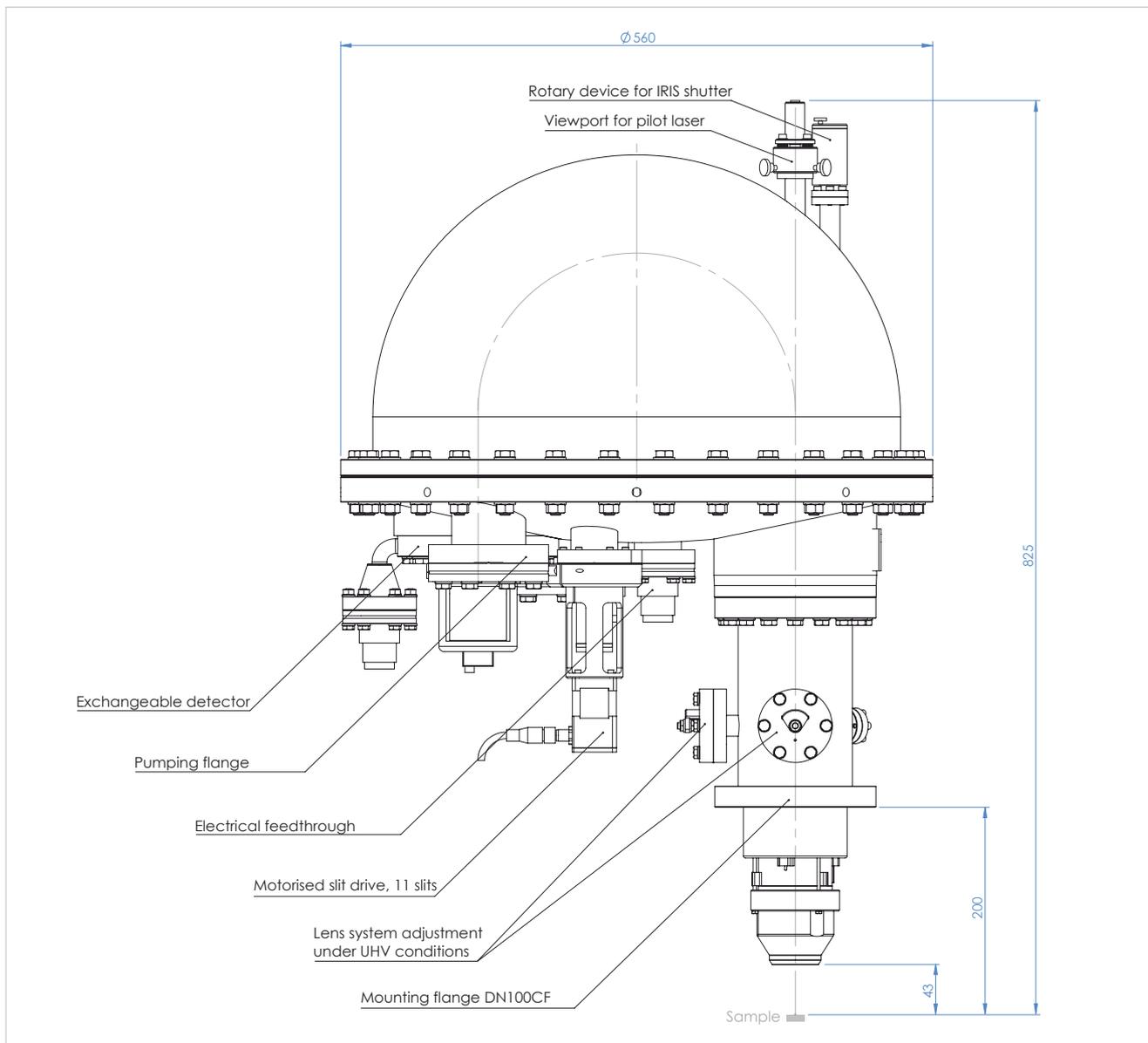


Thanks to the client-server architecture, a client (GUI) can run the software from an arbitrary computer system connected to the network with the help of WiFi and even on mobile devices.

FX
RAPID



The software can be delivered as an integrated part of **PREVAC RAPID FX** environment in order to run synchronized measurements with external instrumentation. It also provides integration with **TANGO** and other control systems



EA15 TECHNICAL DATA

Analyser mean radius	150 mm
Pass energies	1, 2, 5, 10, 20, 50, 100, 200
Energy resolution	
XPS	< 20 meV FWHM at PE 20 eV and 450 eV kinetic energy
XPS/UPS & XPS/UPS/ARPES	< 3 meV FWHM at PE 2 eV and 20 eV kinetic energy
Kinetic energy range	0.5 - 2000 eV
Acquisition modes	Fixed, Scan
Transmission and angular lens mode	
lens acceptance angle (transmission mode)	+/- 15°
lens acceptance angle (angular mode)	+/- 10°
Maximum energy window in fixed mode	12.5 % of pass energy
Working distance	43 mm
Mounting flange	DN 100 CF
Bakeout temperature	up to 150 °C
Completely designed of non-magnetic materials	



EA15



If you need any further information, please do not hesitate to contact our sales department

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