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Posters

Poster	Title	Authors	Meeting
https://cloudone.ing.iac.es:8081/sharing/xHPrrF9Lk	Collection of posters shown at the WEAVE inauguration exhibit at the WHT	Various	WEAVE Inauguration - 30th October 2023



INTRODUCTION

In this work we present the coatings of the spectrograph red camera of WEAWE-the new multi-object survey facility for the 4.2m William Herschel Telescope. The initial requirements of WEAWE red camera lenses, with reflectances as low as 0.4% through the wavelength interval from 590 nm to 959 nm at angles of incidence of $18^\circ \pm 17^\circ$ represented a challenge for both design and production.

AR coating AOI specification

A detailed analysis was carried out regarding the AOI specification of the cameras coatings. Based in Zemax ray tracing, RAL Space provided histograms of the AOI of different rays at each interface airglass for the spherical camera lenses.

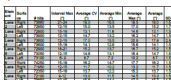


Table 1. Ray tracing over the different surfaces of the spectrometer optics.

Designs

Several designs were developed and the advantages of each were evaluated. The teams of INAOE and CIO collaborated very closely to achieve the best solutions.

Figure 1. Six layer coatings for different substrates

DATA ANALYSIS

The coating evaporations were performed at CIO in the Integrity 30 Denton Vacuum Deposition System. In all the depositions at least a witness samples is included to evaluate the coating quality by measuring afterwards the transmittance of the sample(s).

To be able to calculate the reflectance at other AOI it is indispensable to find the design corresponding to the actual reflectance measured experimentally. A re-optimization through damped least squares of the design is done, using the experimental data as boundary to fit a theoretical model.

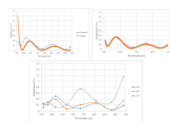


Figure 2: Top left: experimental data and theoretical reflectance, after removing Fresnel reflections from the second surface. Top right: R-optimized design that fits the experimental data. Bottom: data extrapolation to non-normal AOI

Repeatability

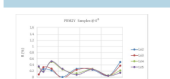


Figure 3 Reflectance obtained in different section num.

Reflectance results for two PBMZY witness samples in two different depositions for the same coating prescription. Samples L62 y L64 were coated in the first run and L63 y L65 in the second one.

FINAL COATINGS

Lens 6 and Lens 7 (PBM2Y)

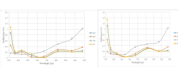


Figure 5. Reflectance obtained for PEMZY Lens 6 and Lens 7, Surface 1

Lens 4 (PBL1Y)

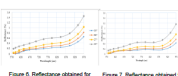


Figure 6. Reflectance obtained for PBLTY Lens 4, Surface 1.

Lens 8 (SLAL-9)

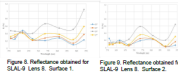


Figure 8. Reflectance obtained for SLAL-Q Lens 8, Surface 1.

CONCLUSIONS

Great amount of R&D has been done in the determination of the most suitable material combination and optimal optical properties of AR coatings for the specific case of WEAVE. The requirements are large AOI and a medium size spectral range. Red Camera coatings are soon to be finished and the Blue Camera along with its AR coatings are under development.

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Antireflective coatings for the red camera of WEAVE

Ortiz (INAOE) et al.

"SPIE Astronomical
Telescopes +
Instrumentation",
Texas, USA, 10-14
June 2018



The WEAVE Observatory Control System

Sergio Picó^{1a}, Don Carlos Abrams^{2a}, Chris Benn³, Lilian Domínguez Palmero⁴, Cecilia Farfán⁵, José Miguel Delgado⁶, Carlos Martín⁷, Diego Cano⁸, Bernardo Salasnick⁹, Steve Guest¹⁰, Frank Giblin¹¹, Jure Škvarč¹², Emanuel Gaulton¹³, Gavin Dalton¹⁴, Kevin Middleton¹⁵, Scott Tragger¹⁶, J. Alfonso Aguero¹⁷, Piercarlo Bonifacio¹⁸, Antonella Vallenar¹⁹, Esperanza Carrasco²⁰

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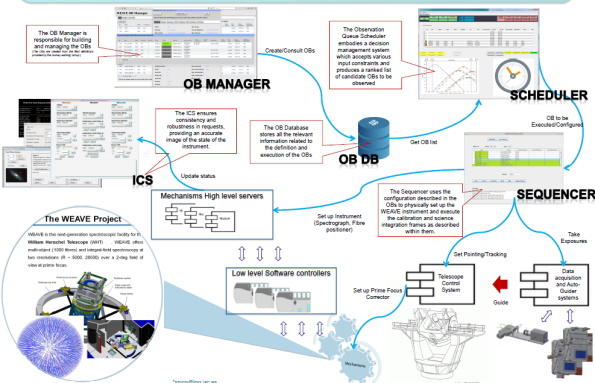
SPIE.

The WEAVE Observatory Control System

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"SPIE Astronomical
Telescopes +
Instrumentation",
Texas, USA, 10-14
June 2018

The Observatory Control System (OCS) is responsible for providing the software control and feedback framework through which WEAVE will be operated. It is built upon the existing software infrastructure in place at the **William Herschel Telescope**, the Instrument Control System (ICS), adding scheduling and sequencing capabilities. All the information related with a WEAVE observation is grouped in an entity denominated **Observing Block** (OB).



First light: WHT, La Palma, 2019

Integration and testing of the WEAVE Spectrograph

Remko Stuik (NOVA) et al.

Abstract

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

WEAVE Specifications

- 4 entrance fibres: 100 fibres at 1000 nm (plate 42), 100 fibres at 1000 nm (plate 43), 100 fibres at 1000 nm (plate 44), 100 fibres at 1000 nm (plate 45)
- 100 fibres at 1000 nm (plate 42), 100 fibres at 1000 nm (plate 43), 100 fibres at 1000 nm (plate 44), 100 fibres at 1000 nm (plate 45)
- 100 fibres at 1000 nm (plate 42), 100 fibres at 1000 nm (plate 43), 100 fibres at 1000 nm (plate 44), 100 fibres at 1000 nm (plate 45)

Planning

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

Integration and testing of the WEAVE Spectrograph

Remko Stuik (NOVA) et al.

"SPIE Astronomical Telescopes + Instrumentation", Texas, USA, 10-14 June 2018

WEAVE

Design of the calibration unit for the WEAVE multi-object spectrograph at the WHT

Lilian Domínguez, Diego Cano, Neil O'Mahony, Carlos Martín, Sergio Pilo, Chris Baser, Scott Tinger, Emilio Llorente, Andy Rilling, Cecilia Fariña, D. C. Abner, Maria Barba, Mike Webb, Jim Lewis, Gavin Doherty, J. A. Aguado, R. Bonifacio, A. Vicens, E. Carrasco

ABSTRACT

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

Mechanism speed

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

Wavelength coverage

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

Focal-plane illumination

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Repeatability of lamp intensity

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

CONCLUSIONS

WEAVE is the next-generation optical spectrograph facility for the William Herschel Telescope (WHT) and aims at spectroscopic follow-up of ground-based surveys and space-based (ESA) surveys. WEAVE places in the WHT prime focus a new 100 cm diameter, 20 m focal length spectrograph with a single slit and a single camera. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m. The spectrograph is a multi-object spectrograph and the focal plane area is 1.5 m x 1.5 m.

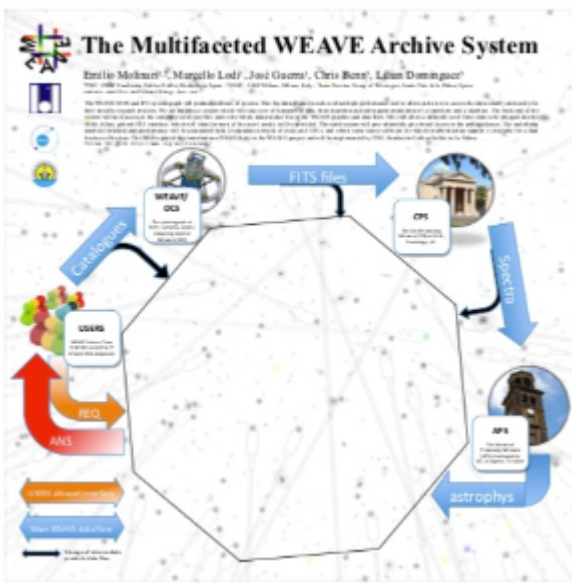
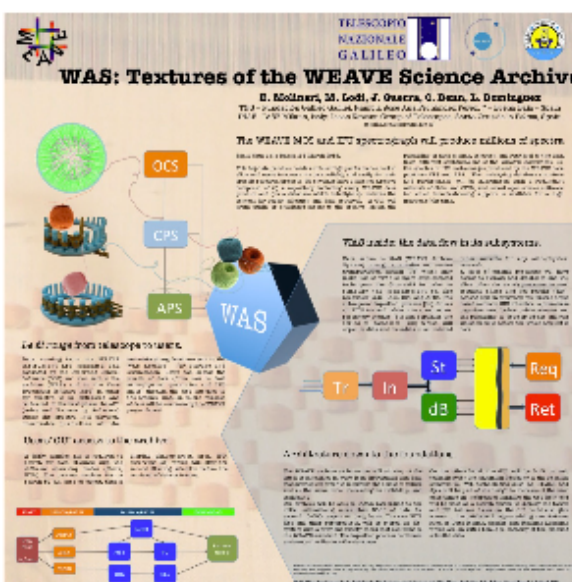
Design of the calibration unit for the WEAVE multi-object spectrograph at the WHT

Lilian Domínguez (ING) et al.

"SPIE Astronomical Telescopes + Instrumentation", Edinburgh, UK, 26 June - 1 July 2016

"SPIE Astronomical
Telescopes +
Instrumentation",
Edinburgh, UK, 26 June
- 1 July 2016

SPIE, Edinburgh, June
2016

 The Multifaceted WEAVE Archive System Enrico Molinari¹, Margale Lod², José Guzmán³, Chris Raux⁴, Lluís Dominguez⁵ ¹INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ²INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ³INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ⁴INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ⁵INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy The WEAVE archive is a multi-faceted system that provides a wide range of services to the astronomical community. It is designed to be a central hub for the storage and distribution of astronomical data, and to provide a variety of tools and services for the analysis and visualization of this data. The archive is organized into several layers, each with its own set of services and tools. The top layer is the WEAVE Science Archive, which provides a wide range of services for the storage and distribution of astronomical data. The next layer is the WEAVE Data Archive, which provides a variety of tools and services for the analysis and visualization of astronomical data. The bottom layer is the WEAVE User Interface, which provides a simple and intuitive way for users to interact with the archive. The diagram shows the flow of data and services between these layers, and the various tools and services that are available to users.	The Multifaceted WEAVE Archive System	Molinari (INAF) et al.	EWASS, Tenerife, June 2015
 WAS: Textures of the WEAVE Science Archive Enrico Molinari¹, Margale Lod², José Guzmán³, Chris Raux⁴, Lluís Dominguez⁵ ¹INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ²INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ³INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ⁴INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy; ⁵INAF - Osservatorio Astronomico di Brera, 20121 Milano, Italy The WEAVE Science Archive (WSA) is a multi-faceted system that provides a wide range of services to the astronomical community. It is designed to be a central hub for the storage and distribution of astronomical data, and to provide a variety of tools and services for the analysis and visualization of this data. The archive is organized into several layers, each with its own set of services and tools. The top layer is the WEAVE Science Archive, which provides a wide range of services for the storage and distribution of astronomical data. The next layer is the WEAVE Data Archive, which provides a variety of tools and services for the analysis and visualization of astronomical data. The bottom layer is the WEAVE User Interface, which provides a simple and intuitive way for users to interact with the archive. The diagram shows the flow of data and services between these layers, and the various tools and services that are available to users.	WAS: Texture of the WEAVE Science Archive	Molinari (INAF) et al.	"Multi-Object Spectroscopy in the Next Decade: Big Questions, Large Surveys and Wide Fields" La Palma, March 2015



WEAVE

The Mechanical Design for the WEAVE Prime Focus Corrector System



Don Carlos Balcells (ING), Chris Benn (ING), Don Abrams (ING), Gavin Dalton (Oxford / RAL), Scott Trager (Groningen), Dave Carter (JMU), Chris Evans (ATC, Edinburgh)

Introduction

The WEAVE Prime Focus Corrector will be mounted onto the telescope structure and will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope.

Optical Layout

The WEAVE Prime Focus Corrector is a complex optical system. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope.

Mechanical Layout

The WEAVE Prime Focus Corrector is a complex mechanical system. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope.

Summary

The WEAVE Prime Focus Corrector is a complex system. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope.

WEAVE Design, Construction and Exploitation

WEAVE is a new wide-field multi-object spectrograph for the William Herschel Telescope. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope. It will be responsible for the prime focus correction of the telescope.

WEAVE The Mechanical Design for the WEAVE Prime Focus Corrector System

Don Carlos (ING) et al.

"SPIE Astronomical Telescopes + Instrumentation 2014", Montréal, Quebec, Canada, 22-27 June 2014



WEAVE

A New Wide-Field Multi-Object Spectrograph for the William Herschel Telescope



Marc Balcells (ING), Chris Benn (ING), Don Abrams (ING), Gavin Dalton (Oxford / RAL), Scott Trager (Groningen), Dave Carter (JMU), Chris Evans (ATC, Edinburgh)

Science

- Milky Way archaeology**
Follow-up of ESA's GAIA mission.
- Structure & dynamics**
radial velocities
10° stars 17 < V < 20
2 km/s accuracy
- Accretion history**
abundances in streams
5°10' metal-poor thick-disk
and halo stars 17 < V < 18
- Star-formation density evolution**
Spectroscopy of LOFAR
complete census ~1000 sources per deg²
- Galaxy evolution**
- Cosmology**
Galaxy redshift surveys
- Nature of dark energy**
Baryonic Acoustic Oscillations
Radial-Space Distortions 10° spectra over 10° deg² redshifts z=0-1.4
- Nearly thin galaxy disks**
dark luminous matter
Disk vertical velocity dispersion
Mass-to-light ratio
Spin-disk dynamics
- Lyman-alpha emitters**
10° emitters in 10 deg²

Science Requirements

- 2 deg field of view
- WFS (multiplex 1000, IFU, mini-IFU front ends)
- Spectroscopic resolution
R = 5000 (280 - 950nm) for velocities
R = 20000 (480 - 880nm) for element abundances
Throughput > 20%

Instrument Concept

- Fibre module**
Design based on AAT's successful 2IFU. This computer simulation shows the complexity of seating 820 fibres in the required positions in the focal plane.
- New prime-focus corrector**
Enlarged field of view 2 deg (currently 40 arcmin)
- Spectrograph (on Nasmyth enclosure)**
2-arm concept
VPH dispersers
R = 5000, R = 20000
- New top-end ring**
Model of new exchangeable top-end ring (with new corrector + fibre module) being craned into position.

WEAVE Design, Construction and Exploitation

WEAVE is being designed and built by a European consortium led by the ING partner countries. The preliminary design phase is expected at the end of 2012, and science observations should start in 2013. The total cost of design and construction, including the new prime focus corrector for the WHT, is €12M.

It is expected that a large fraction of 600T time will be devoted to surveys with WEAVE. Surveys spanning a large range in apparent magnitude can be carried out via coordinated observation of the large FOV/multiplex offered by WEAVE, and the greater depth of observations with GTC, Subaru, MUSE and others.

WEAVE, a new wide-field multi-object spectrograph for the William Herschel Telescope

Marc Balcells, Chris Benn, Don Abrams (ING), Gavin Dalton (Oxford/RAL), Scott Trager (Groningen), David Carter (Liverpool-John Moores), Chris Evans (UKATC)

UK-Germany National Astronomy Meeting NAM2012, Manchester, 27-30 March 2012.

