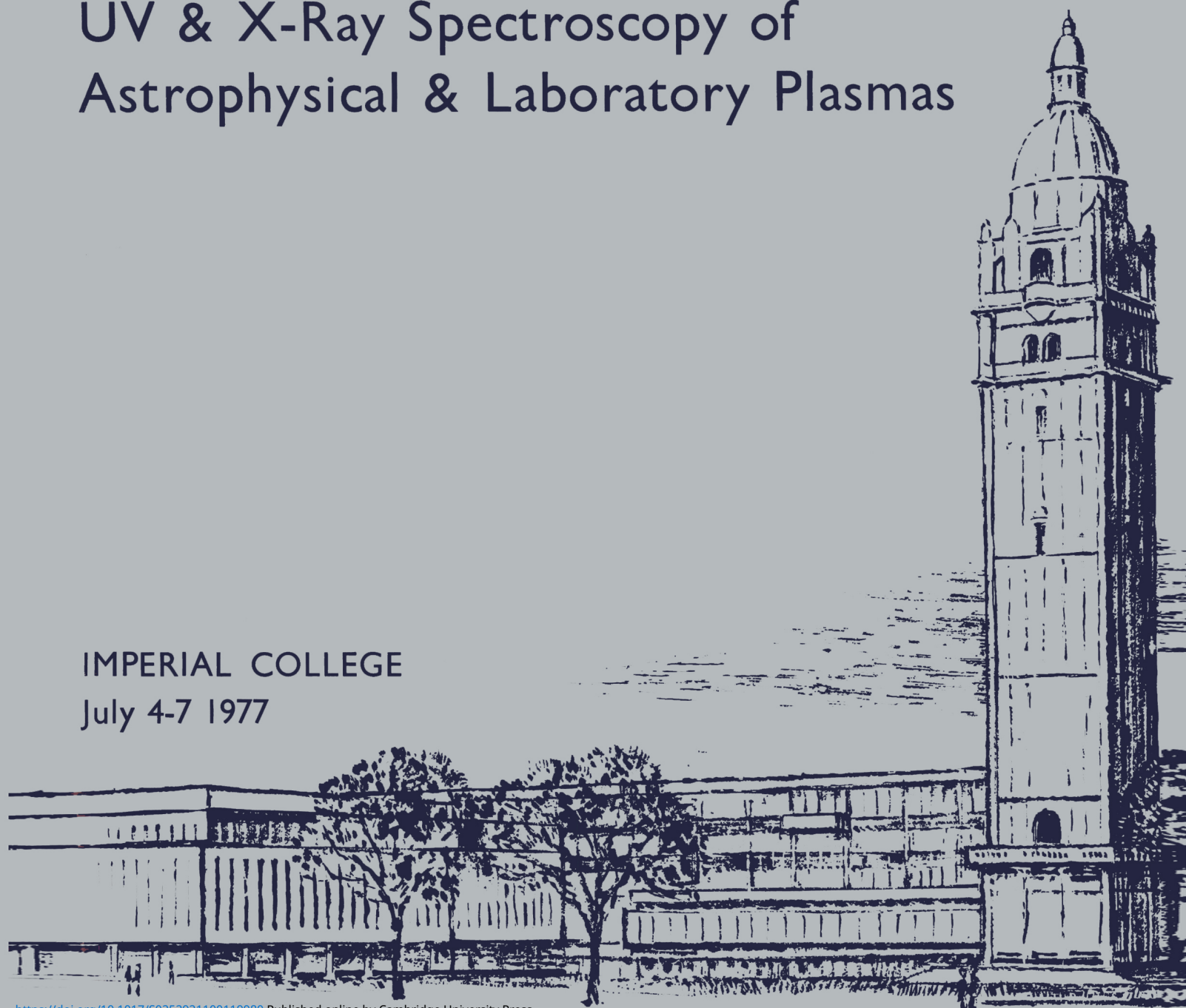


IAU Colloquium no. 43

# Vth Conference on UV & X-Ray Spectroscopy of Astrophysical & Laboratory Plasmas

IMPERIAL COLLEGE  
July 4-7 1977



I.A.U. COLLOQUIUM NO.43  
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5th Conference on UV and X-Ray Spectroscopy  
of Astrophysical and Laboratory Plasmas

July 4 - 7th, 1977

Blackett Laboratory, Imperial College, London.

PROGRAMME AND CONTRIBUTED ABSTRACTS  
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### Scientific Organising Committee

R. M. Bonnet, Paris.  
B. Edlén, Lund.  
R. Haensel, Kiel.  
C. de Jager, Utrecht.  
W.R.S. Garton, London.  
H. J. Kunze, Hamburg.  
S. Mandelstam, Moscow.  
R. W. Nicholls, Toronto.  
G. Noci, Florence.  
K. Pounds, Leicester, England.  
E. M. Reeves, Harvard.  
R. Wilson, London.

### Local Organising Committee

W.R.S. Garton (Chairman), Imperial College, London.  
D.D. Burgess, " " "  
J.P. Connerade, " " "  
A.H. Gabriel, ARD Division, Appleton Laboratory, Slough.  
R. Wilson, University College, London.  
Mrs. B.L. Garton (Secretary), Imperial College, London.

## Preface

On the occasion of this fifth meeting of the series the thanks of the Local Committee are rendered to members of the Scientific Organizing Committee, for advice and most helpful suggestions on the general pattern and the detail of the programme. Similarly, we extend thanks for their efforts to those who have undertaken the Invited Papers, and to those contributing to the bulk of the presentations.

Acknowledgement of financial sponsorship is due both to the International Astronomical Union and to the Royal Society.

W. R. S. Garton

PROGRAMME

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Sunday, July 3rd

- 0900-2100 - Registration, Blakett Laboratory.  
 1830-2100 - Informal reception, Sherfield Building, I.C.

Monday, July 4th

- 0900-1230 - Registration, Poster Session, Imperial College  
 Laboratory Tours.  
 1230-1350 - Lunch  
 1350-1400 - Opening of Meeting.

Laboratory Plasmas I

Abstract  
 No.

Chairman : W.H. Parkinson.

- 1400-1445 - Invited Paper.  
 P. Ewart (London)  
 "Laser Spectroscopy at Ultraviolet Energies"
- 1445-1500 - H.B. Puell, H. Scheingraber and C.R. Vidal, 1  
 (Garching).  
 "Coherent Vacuum-UV Sources using Non-Linear  
 Optics"
- 1500-1515 - R.H. Dixon and R.C. Elton (Washington, D.C.) 2  
 "Resonance Charge-Transfer Effects in Carbon  
 Plasmas and Measured Population-Inversion".
- 1515-1530 - R.W. Lee (London) 3  
 "The Determination of Spectral Line-Shapes  
 for Hydrogenic Ions in Dense Plasmas".
- 1530-1545 - D.D. Burgess, G. Kolbe and J.M. Ward (London). 4  
 "A Direct Measurement of the Collisional  
 Population and Depopulation Rates for the  
 n = 2 State of Atomic Hydrogen".
- 1545-1600 - J.L. Kohl, G. Lafaytis, H.P. Polenius and 5  
 W.H. Parkinson (Cambridge, Mass.)  
 "Absolute Photoionization Cross-Section for  
 $0\ I\ 3p \rightarrow 0\ II\ 4s^0$ ".
- 1600-1630 - Tea.

Monday, July 4th

Abstract  
No.

Chairman: C.R. Vidal

- 1630-1715 - Invited Paper  
M.M. Hessel (Boulder, Colorado).  
"Interatomic Potential and Excimers"
- 1715-1730 - J.C. Viney (Cambridge, England) 6  
"UV Absorption Spectra of Molecules and  
connexion with Pumping Mechanisms for  
Astrophysical Masers".
- 1730-1745 - Miss E.A.M. Baker and D.D. Burgess (London). 7  
"Observations of High-Density Corrections to  
VUV Line-wing Shapes in a Plasma with a few  
particles per Debye Sphere".
- 1745-1800 - E.R. Radtke (Bonn). 8  
4d → 4f Excitation in Lanthanide Vapours".
- 1900 - Cocktail Party, Blackett Laboratory.

Tuesday, July 5th.

Solar I

Chairman: G. Noci

- 0900-0920 - G.E. Brueckner, J-D.F. Bartoe and M.E. Van Hoosier, 9  
(Washington, D.C.).  
"Fine Structure and Dynamics of the Inner Corona".
- 0920-0935 - F.G. Chiuderi-Drago and G. Poletto (Firenze). 10  
"Dynamical Effects in the EUV Chromospheric  
Network".
- 0935-0950 - U. Feldman and G.A. Doschek (Washington, D.C.). 11  
"EUV Spectroscopy of Solar Transition-zone  
Plasmas".
- 0950-1035 - Invited Paper  
R.M. Bonnet (Verrieres-le-Buisson).  
"High Resolution UV Solar Spectroscopy".
- 1035-1100 - Coffee.  
Chairman: M. Burger.
- 1100-1115 - R.G. Athay and O.R. White (Boulder, Colorado). 12  
"Power Spectrum Analysis of time series in  
Positions and Intensities of Solar EUV Lines  
observed with OSO-8".

Tuesday, July 5th (Continued).

<u>Solar I</u>	<u>Abstract No.</u>
1115-1130 - O.R. White and R.G. Athay (Boulder, Colorado). "Phase Differences between Intensity and Doppler-shift and between two EUV Emission Lines of Si II for 300 sec and 95 sec Chromospheric Oscillations".	13
1130-1145 - J.C. Raymond and A.K. Dupree (Cambridge, Mass.) "Non-equilibrium Excitation and Ionization of Be-sequence Ions".	14
1145-1200 - J.E. Vernazza (Cambridge, Mass. and H.E. Mason (Cambridge, England). "Density-sensitive Lines in the EUV Region".	15
1200-1215 - C. Jordan (Oxford, England). "Studies of the Solar Atmosphere using Density-sensitive Line Ratios".	16
1215-1230 - R.M. McQueen (Boulder, Colorado). "Large-scale Variations in Solar Coronal Density and Magnetic Fields".	17
1230-1400 - <u>Lunch.</u>	

Laboratory Plasmas II

Chairman: B. Edlén.

1400-1445 - <u>Invited Paper</u> E. Ya Kononov (Moscow). "Spectra of High-Ionization Stages; the Elements of the Fourth Period in Laser and Vacuum-Spark Plasmas".	
1445-1500 - G.A. Doschek, U. Feldman, D.J. Johnson and D.J. Nagel (Washington, D.C.). "Recent High Spectral and Spatial Resolution Spectroscopy of Laser-produced Plasmas and Electron-Ion Beam Plasmas".	18
1500-1515 - H. Zmora, A. Zigler (Yavne) and J.L. Schwob (Jerusalem). "Investigation of Laser-produced Plasma using Space-resolved Soft X-ray Al Spectrum and Multi-layer Target Technique".	19
1515-1530 - P.J. Hamilton, R.J. Hutcheon, M.H. Key, C.L.S. Lewis, J.A. Lunney and R.K. Thareja (Belfast and Leicester). "The L-Shell Spectroscopy of Heavy Elements in Laser-produced Plasmas".	20

Tuesday, July 5th (Continued)

Abstract  
No.

Laboratory Plasmas II

- 1530-1545 - P.K. Carroll, E.T. Kennedy and G.D. O'Sullivan (Dublin).  
"New Emission Resonances in Laser-produced Plasmas on Cesium, Barium and the Lanthanides". 21
- 1545-1605 - M.M. Mazing, A.P. Shevelko, Yu S. Kasjanov and W.K. Chevokin (Moscow).  
"The X-ray Spectra of Laser Produced Plasmas with a Concave Mica-Crystal Spectrograph and their Time-dependence". 22
- 1605-1630 - Tea.  
Chairman: P.K. Carroll.
- 1630-1715 - Invited Paper  
G. Wendin (Göteborg).  
"Atomic Theory beyond the Hartree-Fock Model".
- 1715-1730 - E. Jannitti, P. Nicolosi, G. Tondello (Padova), and L. Garifo and A.M. Malvezzi (Milano). 23  
"The Broadening of the Lyman Lines of the H-Like Ions Be IV to O VIII in a laser-produced plasma".
- 1730-1745 - J.D. Hey (Cape Town). 24  
"Stark Broadening of Isolated Lines from Multiply-charged Ions".
- 1745-1800 - J.P. Connerade (London). 25  
"On the Quenching of Single Excitation Channels in the Inner-shell Spectra of Certain Elements".

Wednesday, July 6th.

Stellar and Interstellar I

Chairman: C. de Jager.

- 0900-0950 - Invited Paper  
A. Dalgarno (Cambridge, Mass.)  
"Molecules in the Interstellar Medium".
- 0950-1010 - D.J. Carnochan, K. Nandy, A.J. Willis and R. Wilson (London). 26  
"The Problem of the UV Interstellar Absorption Band at 2200Å".
- 1010-1030 - S.K. Ride and A.B.C. Walker, Jr. (Stanford). 27  
"The X-ray Opacity of the Interstellar Medium".
- 1030-1100 - Coffee.



Wednesday, July 6th (Continued)

Stellar and Interstellar I

Abstract  
No.

Chairman: R.M. Bonnet

- 1100-1145 - Invited Paper  
A.K. Dupree (Cambridge, Mass.)  
"Stellar Atmospheres and Coronae".
- 1145-1205 - J.L. Linsky (Boulder, Colorado). 28  
"Formation of the He I and He II Resonance  
and Subordinate Lines in the Sun and Late-  
type Stars".
- 1205-1230 - R. Hoekstra (Utrecht). 29  
"Wavelength Calibration of Balloon-borne  
UV Stellar Spectrograph".
- T.M. Kampermann (Utrecht). 30  
"Calibration of Echelle-Vidicon Combination  
of the "Buss" Instrument".
- 1230-1400 - Lunch.

Stellar and Interstellar II

Chairman: K. Pounds.

- 1400-1445 - Invited Paper  
A.H. Gabriel (Culham).  
"Radiation Processes in High-Energy Astrophysical  
Plasmas".
- 1445-1530 - Invited Paper  
A.B. Underhill (Washington, D.C.).  
"Extended Atmospheres of Hot Stars".
- 1530-1550 - A.J. Willis and R. Wilson (London). 31  
"Studies of the Ultraviolet Spectra of  
Wolf-Rayet Stars".
- 1550-1610 - M. Burger (Brussels). 32  
"Theoretical UV Spectra of B-type Stars;  
Uncertainties in gf-values".
- 1610-1635 - Tea.
- Chairman: R. Haensel.
- 1635-1655 - C. Jamar and F. Praderie (Paris). 33  
"Possible Si II Autoionization Lines in the  
Spectra of Ap-Stars".

Wednesday, July 6th (Continued)

Stellar and Interstellar II

Abstract  
No.

- 1655-1740 - Invited Paper  
J.L. Culhane (London)  
"Cosmic X-Ray Spectroscopy".
- 1740-1800 - W. Pietsch, C. Reppin, R. Staubert, J. Truemper, 34  
W. Voges and E. Kendziorra (Garching and  
Tuebingen).  
"An Emission Line in the Hard X-ray Spectrum of  
Hercules XI : Quantized Cyclotron Emission from  
the Neutron Star".
- 1930 Conference Dinner.

Thursday, July 7th.

Laboratory Plasmas III

Chairman: U. Feldman.

- 0900-0945 - Invited Paper  
N.J. Peacock (Culham).  
"The Spectroscopy of Tokamaks and other  
Laboratory Sources".
- 0945-1000 - M.G. Hobby, M.W.D. Mansfield, N.J. Peacock, 35  
(Culham), and R.D. Cowan (Los Alamos).  
"The Extreme UV Spectra of the DITE Tokamak".
- 1000-1015 - B.S. Fraenkel (Jerusalem). 36  
"X-ray Spectra of Tokamak Plasmas".
- 1015-1030 - M. Klapisch, M. Finkenthal, B.S. Fraenkel, 37  
N. Schweitzer and J.L. Schwob (Jerusalem)  
and "TFR-Group" (Fontenay-aux-Roses).  
"Highly-stripped Ions (up to Mo XXXIII)  
and Forbidden Mo Lines in the Soft X-ray  
Spectrum from TFR Tokamak".
- 1030-1045 - J. Lang (Culham). 38  
"Experimental Electron Excitation Rates  
for Ne VII".
- 1045-1115 - Coffee.  
Chairman: M.M. Mazing.
- 1115-1200 - Invited Paper  
M.J. Seaton (London)  
"Applications of Quantum-Defect Theory".

Thursday, July 7th (Continued).

<u>Laboratory Plasmas III</u>	<u>Abstract No.</u>
1200-1215 - J. Sugar, T.J. McIlrath, T.B. Lucatorto and A.W. Weiss (Washington). "Photoabsorption to Even-Parity Autoionizing Levels of Na I, from the Laser-populated $3p^2P$ States".	39
1215-1230 - K.T. Lu (Argonne, Ill.) "Complex Atomic Spectra made easy: A Multi-channel Quantum-Defect Treatment and Proposal for Experiment".	40
1230-1400 - <u>Lunch.</u>	

Mainly Solar II

Chairman: C. Jordan.

1400-1415 - B.C. Fawcett and G.E. Bromage (Culham) and R.D. Cowan (Los Alamos). "The Computation of Energy Levels and Oscillator Strengths of Fe X to Fe XIII, involving Adjustment of Parameters to achieve Consistency with Observations".	41
1415-1500 - <u>Invited Paper</u> C. de Jager (Utrecht). "The Spectroscopy and Polarimetry of Flare X-Radiation".	
1500-1515 - K.D. Evans, J.P. Pye, and R.J. Hutcheon (Leicester) "Calculation of the temperature structure of an optically-thin plasma from its Emission line spectrum".	42
1515-1530 - L.W. Acton, W.A. Brown, K.J. Strong and R.C. Catura (Palo Alto, California) "Temperature and Optical Depth Dependence of OVII line-ratios with Reference to Solar Coronal Observations".	43
1530-1545 - R. Pallavicini and G. Tofani (Firenze) and G.S. Vaiana (Cambridge, Mass.) "Spatially-resolved observations of Solar Active Regions in soft X-Ray and Centimetric Wavelengths."	44

Thursday, July 7th. (Continued)

Mainly Solar II

Abstract  
No.

- 1545-1600 - F. Bely-Debau (Nice)  
A.H. Gabriel (Culham) and  
S. Volonté (Mons).  
"High Dielectronic Satellite Lines in  
Solar Flare Iron Spectra". 45
- 1600-1630 - Tea.  
  
Chairman: E.M. Reeves.
- 1630-1730 - Panel Discussion  
  
"Current Instrumental Highlights".  
  
Leaders: G.E. Brueckner (Washington).  
P. Sandford (London).  
R.J. Speer (London).
- 1730-1745 - P. Lemaire, G. Artzner, J.C. Vial, R.M. Bonnet,  
P. Gottebroze, A. Jouchoux and A. Vidal-Madjar,  
(Verrieres-le-Buisson); and  
P. McWhirter (Culham), J. Leibacher (Palo Alto),  
A. Skumanich (Boulder, Colorado).  
"O VI Profiles of Solar Quiet and Active Areas  
recorded by OSO-8 LPSP Experiment". 46
- 1745-1800 - Conclusion of Meeting.

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