Irapetra June 2014

THE EARLY SEIRADAKIS Jodrell Bank 1971–1975

Richard Porcas

MPIfR Bonn

" I am pleased to invite you for a talk tribute to J. H. Seiradakis" "You have known him as a close friend since his early career steps"

TRIBUTE: "An act, statement, or gift that is intended to show gratitude, respect, or admiration"

THIS TALK: Early career steps of J. H. Seiradakis

Graduate student days at Jodrell Bank – 1971 to 1975 Shared with Richard Davis and (Lecturer) Ralph Spencer MSc Course Research Fun ! Nostalgia Orientations



John H. Seiradakis (from his web-page)

Last update: Thu Jan 11 15:45:10 EET 2001



Update: John H. Seiradakis Bonn 2003 [Photos by the author unless otherwise stated]

FIRST CAREER STEP 1971

John Seiradakis (and Richard Porcas) apply to join the Jodrell Bank postgraduate M.Sc. course in Radio Astronomy at Jodrell Bank

UNIVERSITY OF MANCHESTER

NUFFIELD RADIO ASTRONOMY LABORATORIES

TELEPHONE: LOWER WITHINGTON 321

TELEGRAMS: RADASTRA, MACCLESFIELD

TELEX 36149

HPP/eb



JODRELL BANK MACCLESFIELD CHESHIRE SK11 9DL

25th March, 1971.

ORIENTATION: JODRELL BANK & RADIO ASTRONOMY?

JODRELL BANK: 1957 – Launch of Sputnik 1 MK-I telescope tracks booster rocket with RADAR

RADIO ASTRONOMY: 1933 – Jansky discovers radio emission from Milky Way

 $1951 - HI \ 21 \, cm$ emission from Galactic spiral arms

1963 – Discovery of Quasars – 3C 273, 3C 48
1964 – Discovery of Cosmic Microwave Background
1967 – Discovery of Pulsars
1971 – Discovery of Superluminal Motion in 3C 279

22 April 1971 – Seiradakis and Porcas interview at Jodrell Bank

Invitation for interview at Jodrell Bank 1971

Dear Mr. Porcas,

We are now making arrangements for preliminary interviews for our M.Sc. applicants. I therefore invite you to come to Jodrell Bank between 12 noon and 1 p.m. on Thursday, 22nd April. If this date is not convenient we may be able to arrange another one.

Please bring a recent small photograph of yourself for our files.

If you travel by rail I suggest you catch the 0900 from Euston which arrives in Crewe at 1106. Then take the 1128 from Crewe arriving at Goostrey at 1144, where I will arrange for you to be met. If you travel by road, please arrive at the North entrance (the one shown on the map). I suggest you then leave your vehicle on the Concourse car park, walk to the Control Building and ask for me there.



The MK-I telescope



The MK-I telescope

Going to Jodrell Bank for interview 22 April, 1971



The MK-II telescope

"M.SC./DIPLOMA COURSE 1971-72"

(A) FIRST 6 MONTHS

• 3 LECTURE COURSES

Astronomy and Astrophysics (partly in Manchester) Radio Astronomy Techniques and Electronics for Radio Astronomy EXAMINATIONS !

High and low-level computer programming (no examination)

- PRACTICAL PROJECT
- LITERATURE PROJECT

(B) NEXT 6 MONTHS

• M.Sc. or Diploma Project – THESIS

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(C) NEXT 2(+) YEARS
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• Ph.D. Project – THESIS

NUFFIELD RADIO ASTRONOMY LABORATORIES

M.Sc./Diploma Course 1971-72

For the first two terms, students will attend three courses of lectures and supervised laboratory classes. Course I is given partly in the University on Tuesday mornings. Students have no appointments at Jodrell Bank on that day and will be able to spend the whole day in Manchester if they wish. Attention is drawn to Professor F.D. Kahn's lectures on "Theory of Radio Sources" at 2.30 p.m. on Tuesdays in the Moseley Lecture Theatre, Schuster Building, and students are encouraged to attend.

Two short lecture courses (non-examined) on computer programming will be given. One on a high-level language will be arranged in the second term. The other, on the low-level language for the Argus computer used extensively at Jodrell Bank, will be given by Dr. Daintree after the March examination.

ASTRONOMY AND ASTROPHYSICS

RDD - Dr.R.D.Davies Dr.P.Stewart (Maths Dept) Astrophysical Plasmas

General Astronomy Prof.F.D.Kahn (Astr.Dept) Theory of Radio Sources

RADIO ASTRONOMY

BR	-	Dr.B.Rowson	Review of radiation theory
RGC	-	Dr.R.G.Conway	Galactic radio astronomy
HPP	-	Dr.H.P.Palmer	Extragalactic radio sources
RSB	-	Mr.R.S.Booth	Spectral line observations in radio astronomy
AGL	-	Dr.A.G.Lyne	Scintillations
ACBL	-	Prof.Sir Bernard Lovell	Cosmology
JGD	-	Prof.J.G.Davies	Pulsars

TECHNIQUES AND ELECTRONICS FOR RADIO ASTRONOMY

-	Dr.D.Walsh	Observational systems in radio astronomy
-	Dr.E.J.Daintree	Digital Circuits
-	Dr.R.E.Spencer	Transistors and Amplifiers
-	Mr.I.Morison	Circuit Theory and Filters
-	Dr.B.Anderson	Distributed Circuits
		 Dr.D.Walsh Dr.E.J.Daintree Dr.R.E.Spencer Mr.I.Morison Dr.B.Anderson

	Course	II		Ce	ourse II	<u> </u>
Week			Term 1			
1		BR		DW	DW	DW
2	BR	BR		DW	DW	DW
3	BR	BR		DW	DW	DW
4	BR	RGC		DW	DW	DW
5	RGC	RGC		EJD	EJD	DW
6	RGC	RGC		EJD	EJD	DW
7	RGC	HPP		EJD	EJD	EJD
8	HPP	HPP		RES	RES	RES
9 10	HPP HPP	HPP HPP	Term 2	RES RES	RES RES	DW DW
	Mid-se	ssional	examinations,	Jan.6th,	7th.	
l	RSB	RSB	AGL		IM	IM
2	RSB	RSB	AGL		IM	IM
3	RSB	RSB	AGL		IM	IM
4	RSB	RSB	AGL		BA	BA
5	ACBL	ACBL	JGD		BA	BA
6	ACBL	ACBL	JGD		BA	
7	ACBL					

Final examinations Mar 8th, 9th.

Week commencing Mar 22nd - Argus programming course.

An international crowd with some exotic accents !

- 4 normal people
- 1 Yorkshireman
- 2 Mancunians (Manchester)
- 2 Scotsmen
- 1 Greek gentleman ("The Grick")



Warwick Jones Starkie Davis Gray McLaughlin Porcas Seiradakis

[Photo by W. McLaughlin]



[Photo by W. McLaughlin]

Where we were





Getting to Jodrell Bank: Monday, Wednesday, Thursday, Friday (for those of us without a car)



The bus service operated for the benefit of students leaves Wilmslow railway station at 9.05 a.m. and picks up passengers at the bus-stops at the following points: the Rex Cinema, Wilmslow; opposite the King's Arms, Wilmslow; opposite the National Westminster Bank, Alderley Edge; Monks Heath crossroads. The bus is operated by Bostocks so is recognizable from other local buses.

[Photo from internet]



MK-I becomes MK-IA



MK-IA re-named "Lovell Telescope" in 1987



The MK-II telescope: 1971 and 1987 (with new panels)

[1987 photo from Wikipedia]



50-ft telescope



Polar-axis telescope - asleep (normal) and dancing (rare)



MK-II from underneath polar-axis telescope

Lectures in Manchester on Tuesdays



The Schuster Building (built 1967)

[Photo from manchesterhistory.net]

Lectures in Manchester on Tuesdays



The Maths Tower (built 1968)

"a quirky combination of 1960s-brutalism and international style modernism"

ORIENTATION: COMPUTERS AND OTHER MATTERS

COMPUTERS

- U. Manchester Regional Cumputer Center
- Serving all of U.Manchester and many other northern universities
- Boasted fastest commercially available computer in world (CDC 7600) 30 MFLOPS (Ipad2 has 170 MFLOPS)
- Communication via punched paper-tape and land line from Jodrell
- 3 Ferranti Argus machines at Jodrell for telescope control and analysis (0.1 MFLOPS)
- the main talking point was the new pocket calculators !

WE DID NOT HAVE

• internet email laptops PCs monitors magnetic tape

WE ALSO DID NOT HAVE

• mobile phones smartphones satnav

WE DID, HOWEVER, HAVE TELEPHONES

The Maths Tower – 2005



The Maths Tower (demolished 2005)





" Of almost all the university buildings of the last forty years, only the Maths Tower has grace and scale. A pity then, that it is unfit for purpose."

"I always hated that ugly thing – a windswept, piss stained and elevated relic from a period when some old connecting walkways never quite materialised"

ORIENTATION: STUDENT ENTERTAINMENTS

\mathbf{TV}

- No digital, cable or satellite TV
- No DVDs or video cassettes
- 3 analogue TV channels
- with MONTY PYTHON'S FLYING CIRCUS every week!

MUSIC

- No MP3 or CDs music cassettes not widespread
- Vinyl LPs
- (reel-to-reel tape recorders)

${\bf Local \ Entertainments-I}$



The New Inn Wilmslow

Local Entertainments – II



When this world began It was Heaven's plan There should be a girl for ev'ry single man. To my great regret Someone has upset Heaven's pretty progamme for we've never met. I'm clutching at straws, just because I may meet her yet.

Somebody loves me, I wonder who, I wonder who she can be. Somebody loves me, I wish I knew, Who can she be worries me. For ev'ry girl who passes me I shout, "Hey, maybe You were meant to be my loving baby." Somebody loves me, I wonder who, Maybe it's you.

"Ladycroft" Alderley Edge

[Photo from gilesdarling.me.uk]



Dakis ("The Grick")

Dickie Davis

Porky

["World of Sport" photo from lovemakethink.com]

During the first term, each M.Sc. student undertakes a Literature Review with guidance from a member of the teaching staff and a Research Fellow or senior student. The subject is chosen by the M.Sc. student from a list of proposed titles. Early in the second term, the student is expected to give a short oral account of his topic to the other members of the M.Sc. Course. The organization of this is the responsibility of Mr. R.S. Booth.

The laboratory is under the direction of Dr.R.E. Spencer with Dr.P.K. Wraith and Professor J.G. Davies acting as demonstrators.

General organization of the Course is the responsibility of Dr. D. Walsh.

Literature Project List 1971

B.Anderson	Magnetic fields in quasars
R.E.Spencer	The arrival direction of cosmic rays
R.E.Spencer	Radio emission from cosmic ray air showers
A.G.Lyne	Crab pulsar
B.Rowson/P.N.Wilkinson	Black holes - are they detectable ?
I.W.A.Browne	Are all redshifts cosmological ?
H.P.Palmer/R.Peckham	Are the redshifts of quasars distributed randomly ?
H.P.Palmer/R.Peckham	The relationship between angular size and structure, and variability of radio sources
R.D.Davies/A.J.Wilson	Molecules in the Galactic centre
R.D.Davies/A.J.Wilson	OH emission from infra-red stars
I.Morison	Radar studies of the moon
E.J.Daintree	Noise sources and the measurement of noise figure
R.G.Conway/J.Gilbert	Is the Crab pulsar a spinning magnet ?
R.G.Conway/J.Gilbert	Radio emission from Jupiter
A.P.Pedlar	Ionised gas in the Galaxy
A.P.Pedlar	Electron temperature from excited H lines
R.D.Davies/A.J.Wilson	High velocity clouds
JHS gives literature review - first lecture ?



RWP prepares literature review in Jodrell library



Technical project - JHS and RJD

Measuring the diameter of the radio Sun





Technical project - JHS and RJD



Technical project - JHS and RJD



The Planetarium



The Planetarium



If, due to some unforeseen problem, you are unable to attend or if you wish to switch with another person - this would have to be mutually agreed - I would be grateful if you would inform me as soon as possible.

T.W.Rackham.

 $\pounds 2.50$ per afternoon (3 shows)

Seiradakis and Porcas amongst the first volunteers !

CHOOSING A RESEARCH TOPIC FOR A PHD

• Seiradakis and Porcas also for an MSc

• A variety of topics offered by the Jodrell Bank research groups

• All research conducted with Jodrell Bank research facilties

ORIENTATION: INTERNATIONAL FACILITIES

In 1971

- There was no LOFAR VLA VLBA MERLIN VLBI-Networks
- There was no HST MMT....
- There was no ROSAT XMM-Newton Fermi

Just coming online

- Westerbork (1970) Cambridge 5km (1971) Effelsberg (1972)
- Uhuru (1970) first dedicated X-ray astronomy satellite

Jodrell Bank Research Groups

PULSARS F.G.SMITH, J.G.DAVIES, A.G.Lyne

Seiradakis, Jones

SURVEY

D.WALSH, E.J.Daintree, I.W.A.Browne, R.E.B.Munro Porcas

POLARISATION

R.G.CONWAY, J.Gilbert

Davis

LONG BASELINE

H.P.PALMER, B.Anderson, B.Rowson, R.E.Spencer, R.Peckham, P.N.Wilkinson Warwick

H–LINE

R.D.DAVIES, R.S.Booth, J.Wilson, A.Pedlar McLaughlin, Stephenson

J.E.B.Ponsonby I.Morison R.Prichard

JOHN SEIRADAKIS IN THE PULSAR GROUP

408 MHz Pulsar Survey



Cumulative count of known pulsars with time (Lorimer)

408 MHZ PULSAR SURVEY OBSERVATIONS

26 July - 21 September 1972

- Searched 3280 MKIA beams, each 11 minutes
- **NEW** Real time analysis on Argus 400 computer
- Basic pulsar period search range: 0.16 1.45 s
- Found 18 new pulsars, flux densities 13 95 mJy, periods 2.35 0.156 s
- Follow-up DM measurements in range 21 230 pc. cm⁻³
- PSR 0611+22 found within 0.6° of SNR IC443; P/\dot{P} 125,000 years

Arecibo PALFA pulsar survey:

- period range $0.5 \,\mathrm{ms} 16 \,\mathrm{s}$
- **RM** range $0 5000 \, \text{pc. cm}^{-3}$
- flux density limit $20 \,\mu Jy$

• SEIRADAKIS PULSAR CATALOGUE

FIRST PUBLICATION – 30 AUGUST 1972

Circular No. 2436

CENTRAL BUREAU FOR ASTRONOMICAL TELEGRAMS INTERNATIONAL ASTRONOMICAL UNION

POSTAL ADDRESS: CENTRAL BUREAU FOR ASTRONOMICAL TELEGRAMS, SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS. 02138, USA CABLE ADDRESS: SATELLITES, NEWYORK - WESTERN UNION: RAPID SATELLITE CAMBMASS

ELEVEN NEW PULSARS

J. G. Davies, A. G. Lyne and J. H. Seiradakis, Nuffield Radio Astronomy Laboratories, Jodrell Bank, report the discovery of 11 new pulsars with the 76-m telescope between July 26 and Aug. 21:

PSR	α1950	δ1950	e b	Hel. P (µs)
0153+61	$1^{h}53^{m}00^{s}\pm 60^{s}$	+61°55'± 10'	130°5 +0	2 2351612 ± 1
0355+54*	3 55 00 ± 40	+54 13 ± 8	148.1 +0	.9 156380 ± 1
0611+22	6 11 10 ± 60	+22 35 ± 12	188.7 +2	.4 334919 ± 1
1718-32	17 18 40 ± 40	-32 05 ± 10	354.5 +2	.5 477154 ± 2
1819-22	18 19 50 ± 60	-22 53 ± 8	9.4 -4	.3 1874398 ± 7
1822-09	18 22 40 ± 60	- 9 36 ± 7	21.4 +1	.3 768948 ± 1
1826-17	18 26 15 ± 60	-17 54 ± 10	14.6 -3	3.3 307128 ± 2
1831-03	18 31 00 ± 40	- 3 40 ± 10	27.7 +2	.3 686676 ± 3
1846-06	18 46 07 ± 40	- 6 43 ± 7	27.7 -2	2.4 1451323 ± 9
1907+02	19 07 20 ± 40	+ 2 56 ± 11	37.7 -2	2.7 494914 ± 3
2256+58	22 56 30 ± 60	+58 50 ± 7	108.9 -0	0.7 368242 ± 2
* Evident	ly identical with	one of those	reported or	IAUC 2435.

JOHN SEIRADAKIS WORKING HARD 1972–3

Davies, J. G.; Lyne, A. G.; Seiradakis, J. H. "Eleven new pulsars" IAU Circular 2436 (30 August 1972) 3 citations

Davies, J. G.; Lyne, A. G.; Seiradakis, J. H. "Pulsar Associated with the Supernova Remnant IC 443" Nature 240, 229 - 230 (24 November 1972 – received 11 October 1972) 79 citations

- 18 new pulsars; SNR IC442 association
- "analysis carried out in real time on the Argus data processing computer"

Seiradakis, J. H. "High sensitivity pulsar search" M.Sc. Thesis, University of Manchester (1973)

STUDENT PROJECT OBSERVATIONS 1972–3

408 MHz Pulsar Survey: Seiradakis 26 Jul – 21 Sep 1972

966 MHz Source Survey: Porcas 5 Dec 1972 – 24 Jan 1973

408 MHz Pulsar Survey: Seiradakis May–Jun 1973

966 MHz interferometer: Porcas Jul – Aug 1973

PAUSE

966 MHz interferometer: Porcas Apr 1974

Young European Radio Astronomers Conference (YERAC)

1968 Meudon 1969 Jodrell Bank 1970 Dwingeloo 1971 Effelsberg 1972 Bologna

Wednesday 25 July	
0930-11.00 "Pulsars and Extragalac	tic"
Pulsar Searches	J.H. Seiradakis (Jodrell)
Pulsar Observations?	W. Sieber (Bonn)
The Surroundings of Pulsars	R.E. Schönhardt (Bonn)
Pulsar Observations	A.I.O. Mclean (Jodrell)
A new Lacertid	J. Crovisier (Meudon)
Fine Structure of Radio Sources at 81.5 MHz	A.C.S. Readhead (Cambridge)

COFFEE

11.30-1300 "Extragalactic" continued.

Extra-galactic Research at the R.G.O.	C.M.N. Moss
Radio Sources and Clusters of Galaxies	Mrs. J.M. Riley (Cambridge)
Optical and Radio properties of Quasars	D. Stannard (Jodrell)
Studies of Radio Sources with an Interferometer of 23km Baseline	P. Wilkinson (Jodrell)
A Radio Source survey at 966 MHz	R.W. Porcas (Jodrell)
Source surveys and source counts	T.J. Pearson (Cambridge)

CAMBRIDGE YERAC July 1973

Cambridge YERAC July 1973

J.H.Seiradákis Pulsar searches.

A pulsar search is a four-dimensional search! Position (2 dim), dispersion measure (distance) and period, are the unknown parameters of a pulsar that a search must reveal. 31 new pulsars have been discovered at Jodrell Bank using a periodicity search technique, since July 1972. The search area was uniformly covered and a statistical approach to pulsar distributions will be possible.



Ancient Grick pulsar 4-dimensional search engine

[Photo from Wikipedia]

Cambridge YERAC July 1973

The new 5 km telescope







a			YOU	R HOLIDAY		
			ITINERARY			
OLY	MPIC OLIDA'	YS LONDON: MANCHESTER	24 Queensway, L R: Lancaster Buildir	ondon W2 3RX. Tel: 01- ngs, 14 Barton Square, M2	727 8050 2 7LW. Tel: 061-832	
Departure: BAGGAGE AL	Thursday A	On BEA Airtours Boo	Airport:	London Gatwick Ai age allowance is 44	rport Ibs. (20 kgs.)	
Departure: BAGGAGE AL per person. (I CHECK IN AT 45 minutes befor Note: These ti All dep	Thursday A LOWANCE – Exceptions – GATWICK A ore your fligh imings superse artures and a	UG 30'73 On BEA Airtours Boo infants under 2 years) AIRPORT – Please che at departure time as sl ede any previously ac rrival times shown ar	Airport: eing 707, bagge ck in at the BE hown below. lvised. e local.	London Gatwick Ai age allowance is 44 A Airtours desk no la	rport Ibs. (20 kgs.) ater than	
Departure: BAGGAGE AL per person. (I CHECK IN AT 45 minutes befor Note: These ti All dep Date	Thursday A LOWANCE - Exceptions - GATWICK A ore your fligh imings superse artures and a Flight No.	On BEA Airtours Boo infants under 2 years) AIRPORT – Please che at departure time as sl ede any previously ac rrival times shown ar From	Airport: eing 707, bagge ck in at the BE/ hown below. Ivised. e local. Depart/Time	London Gatwick Ai age allowance is 44 A Airtours desk no la To	rport Ibs. (20 kgs.) ater than	
Departure: BAGGAGE AL per person. (I CHECK IN AT 45 minutes before Note: These ti All dep Date AUG 30 73.	Thursday A LOWANCE - Exceptions - GATWICK A ore your fligh imings superse artures and a Flight No. KT 996	UG 30'73 On BEA Airtours Boo infants under 2 years) NRPORT – Please che at departure time as sl ede any previously ac rrival times shown ar From London Gatwick	Airport: eing 707, bagge ck in at the BE hown below. dvised. e local. Depart/Time 11.40	London Gatwick Ai age allowance is 44 A Airtours desk no la To Athens	rport Ibs. (20 kgs.) ater than Arrive/Time 15.50	



Relaxing before the "Year of the Theses"

[Photo of the author by R.B.Gray]



Athens

Greek Holiday Off to Crete





Koutsouras, Crete



Koutsouras, Crete



"When he and Sofia were kids, his Mother used to bring a glass ornamental pig to the dinner table. She would place it facing the kids and whoever made the most mess was awarded the pig for the rest of the day"

(Photo and story from Ralph Gray)

John Seiradakis publications from the pulsar search

Davies, J. G.; Lyne, A. G.; Seiradakis, J. H. "Eleven new pulsars" IAU Circular 2436 (30 August 1972) 3 citations

Davies, J. G.; Lyne, A. G.; Seiradakis, J. H. "Pulsar Associated with the Supernova Remnant IC 443" Nature 240, 229 - 230 (24 November 1972 – received 11 October 1972) 79 citations

- 18 new pulsars; SNR IC442 association
- "analysis carried out in real time on the Argus data processing computer"

Davies, J. G.; Lyne, A. G.; Seiradakis, J. H. "Thirteen New Pulsars" Nature Phy.Sci. 244, 84–85 (Aug 6 1973 – received 6 July 1973) 27 citations

Davies, J. G.; Lyne, A. G.; Seiradakis, J. H. "The galactic distribution of pulsars" MNRAS 179, 635-650 (June 1977); Received 16 Sep 1976) 54 citations

• distribution of 51 pulsars from the survey

Seiradakis, J. H. "Radio emission from X-ray pulsars" The Observatory 99, 131-132 (1979) 5 citations

THE YEAR OF THE THESES 1974–1975

SEIRADAKIS: Low latitude pulsar survey at 408 MHz

PORCAS: Optical identification of radio sources from a survey at 966 MHz

DAVIS: The distribution of brightness and polarization of small angular diameter radio sources at decimetric wavelengths

WARWICK: High resolution studies of the structure of weak radio sources at 408 and 1666 MHz

LIFE AFTER JODRELL BANK

1975/07 - 1976/12	MPIfR Bonn
1978/02 - 1979/01 1979/02 - 1979/04	University of Hamburg MPIfR Bonn
1979/09 - 1982/06	University of California, San Diego
1982/09 - 1984/04	MPIfR Bonn (von Humboldt Fellow)
1984/05 - 1984/12	MPIfR Bonn (scientific advisor)
1985/01 - 1985/08	MPIfR Bonn (guest scientist)
1985/07 - 1996/05	Associate Professor, Aristotle University of Thessaloniki
1991/09 - 1992/07	MPIfR Bonn (senior guest scientist)
1996/05 –	Full Professor, Aristotle University of Thessaloniki

YERAC 1978 Jodrell Bank

		YERAC XI 1978		PORCAS
	Scientific Programme			
	MONDAY 17 JULY Plan	netarium, Jodrell Ba	nk	3
0930	Welcoming address by Si	r Bernard Lovell		
0945	Session 1 PULSARS	<u>(</u> 0)	hairman: Dr Andrew	Lyne)
	Mike Salter	Jodrell Bank	Pulsar proper motic	ns
	Leszek Nowakowski	Torun	On possible interpr pulsar velocities	etations of
	John H. Seiradakis	Hamburg	Measurement and imp intrinsic position polarization of pul	lications of the angles of the sars

Summary

The intrinsic angle of polarization at the centre of the integrated pulse profile of a sample of pulsars tends to be either parallel or perpendicular to the proper motion vector.

This supports the hypotheses that pulsars, when born, were accelerated by the asymmetric radiation reaction.

LETTER FROM HAMBURG 1979

CORRESPONDENCE

To the Editors of 'The Observatory'

Radio Emission from X-ray Pulsars

GENTLEMEN,-

In a recent letter, Apparao and Chitre¹ suggest that high-sensitivity radio observations of the binary X-ray pulsar Her X-1 would cast some light on its mechanism of emission.

The 1.2-second X-ray pulsar (identified with the variable star HZ Her) has a 35-day cycle during which it is 'on' for about 10 days and 'off' for about 25 days².

Both radio and X-ray pulsars are believed to be rotating magnetic neutron stars although, with the exception of the Crab and Vela pulsars, no common identifications between the two groups have been observed. The X-rays are most likely generated at the magnetic poles of the star, through accretion of matter. The radio emission, according to one school of thought³, arises from high-energy particles ejected from the poles. According to another school of thought⁴, it arises near the light cylinder of the fast-rotating neutron star. In the former case the radio emission is expected to be suppressed in X-ray pulsars because of the accretion of matter at the poles. If this is the case with Her X-1, radio emission should be detected during the 'off' state of the X-ray cycle. Hartmann and Lapedes⁵ give an upper limit of 100 mJy at 430 MHz. Apparao and Chitre¹ estimate a flux density of 10-100 mJy. HZ Her was observed on several occasions at Jodrell Bank with the 76-m Mk IA radio telescope in the summers of 1972 and 1973, during a pulsar survey. The observing system was that described by Davies, Lyne and Seiradakis⁶. The centre frequency was 408 MHz and the bandwidth used was 4 MHz. The beamwidth of the telescope at this frequency is 45' and the system gave about 1.2 K/Jy.

The observations were made at various times during the 35-day cycle of the star, with a slight preference towards the 'on' phase. Integrations between 2 and 10 minutes were taken, folding the data at the expected period of the X-ray pulsar. Also the pulsar search system was employed in the period range 0.2 to 3 seconds. The minimum detectable flux was 10 mJy.

No sign of periodic signals was observed in any of the observations, either during the 'on' or during the 'off' phase of the 35-day cycle, thus yielding an upper limit of 10 mJy at 408 MHz for any periodic emission. This is rather surprising for a relatively young neutron star such as Her X-1. It rather suggests that the first emission mechanism³ is wrong. This conclusion need not apply to radio pulsars, however, because of the absence of any mutual identification between the two populations as mentioned earlier. The facts that radio pulsars are less massive than X-ray pulsars, have shorter periods and seem to be less erratic in their radiation indicate that there are fundamental differences either between the two populations, or between their emission mechanisms.

I am, Gentlemen,

Yours faithfully, I. H. SEIRADAKIS

Hamburger Sternwarte,

Gojenbergsweg 112, D-2050 Hamburg 80, Bundesrepublik Deutschland.

1979 March 11.

Bonn 1984



Bonn





Thessaloniki 1993



With "John Höschen"

Thessaloniki 1993



"Which end do you look through?"

Thessaloniki 1993



Bonn 2003


Jodrell Bank 50th Anniversary Reunion 2007





"Have they thrown away my thesis ?"

[Photo by R.B.Gray]





No !

[Photo by R.B.Gray]

Manchester University Library (for posterity.....)

High sensitivity pulsar search..

John Hugh Seiradakis University of Manchester. Department of Physics and Astronomy.

Manchester : University of Manchester 1973

Available at Joule Library Theses (Th10615)

Get It Details

☆ Low latitude pulsar survey at 408 MHz..

John Hugh Seiradakis University of Manchester. Department of Physics and Astronomy.

Manchester : University of Manchester 1975 Available at Joule Library Theses (Th10616)

Get It Details

Student

Professor





THANK YOU FOR YOUR ATTENTION!

