



PRIME FOCUS

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Presidents Report

John Rombi

Happy New Year and Welcome to the

“International Year of Astronomy”

MAS Committee

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M.A.S. is going to have a busy year; we will be holding monthly observing nights at The Domes, at First Quarter Moon. At this point I would like to thank all the members that have made themselves available for these events.

April is going to be a busy month, with The Campbelltown Show plus The Historical Societies of Campbelltown and Narellan requesting our input. There is still some fine tuning to be carried out, but all is going well.

Our private observing nights will continue (at Stargard & The Forest); please check the website for the dates.

Membership & A.G.M.

Unfortunately all this fun we have does have a cost, a small one at that!

Membership fees are due from **February 1st**.

Please see Dick Everett (our Treasurer) he will be happy to take your money!

Our A.G.M will be held in April, this will mean the installment of a new committee, so if you would like to be at the “coalface” in formulating ideas for the advancement of M.A.S into the future, please see a committee member.

Our pinnacle of the I.Y.A will be Prof Fred Watson's public lecture at U.W.S Campbelltown, followed by an Observing Session at The Domes for the public (weather permitting)

This will be held on Saturday September 26th, please pencil this in on your calendar.

Fred Watson & James Morrison will be starring in *"Hot Stars, Cool Jazz"* at the conservatorium of Music on Friday February 20th. Four members and their significant others will be attending, if you would like to join us, go to Hot Stars, Cool Jazz for your tickets.

The weather has played havoc with our observing sessions but.....we did get one great night on New Years Eve. Clear steady skies greeted Chris, Trevor, Anne, Roger, Tony, Moh, Ahmed and I.

It was like looking at a bunch of kids in a lolly shop. By the time we closed the session (3.30am New Years Day) there was a group of very happy astronomers.

Next Month

Our speaker will be Ian Cook (M.A.S member)

March

Our speaker will be Prof Geraint Lewis (Syd Uni) Geraint was a BIG hit when he visited us in early 08, so don't miss this one!

Member Doings

A big well done to all members that have been busy Messier hunting. It's good to see the experience being gained by having to search the sky for these beautiful, but elusive objects.

The astro-imagers ranks have also grown, with Debbie Taylor having taken up this exciting part of Astronomy.

So everyone take a BIG deep breath, and get ready for a great *I.Y.A 2009*.

Tonight

I would like to thank Chris Malikoff (our Webmaster) for reprising information on the use of our website. If you have any issues, problems or questions concerning the use of our site, now is the time to ask!

Observing Dates

January

19/01/09 General Meeting
24/01/09 The Forest
31/01/09 Stargard

February

16/02/09 General Meeting
21/02/09 Stargard
28/02/09 The Forest

March

16/03/09 General Meeting
21/03/09 Stargard
28/03/09 The Forest

April

18/04/09 Stargard
20/04/09 AGM
25/04/09 The Forest

May

18/05/09 General Meeting
23/05/09 The Forest

June

15/06/09 General Meeting
20/06/09 The Forest
27/06/09 Stargard

July

18/07/09 Stargard
20/07/09 General Meeting
25/07/09 The Forest

August

15/08/09 Stargard
17/08/09 General Meeting
22/08/09 The Forest

September

12/09/09 Stargard
19/09/09 The Forest
21/09/09 General Meeting

October

10/10/09 Stargard
17/10/09 The Forest
19/10/09 General Meeting

November

14/11/09 The Forest
16/10/09 General Meeting
21/11/09 Stargard

December

12/12/09 Stargard
19/12/09 The Forest

Secretary's Column

Roger Powell

Welcome to 2009, the *International Year of Astronomy!*

The committee will be working hard during 2009 to put astronomy on the map and we will be looking to involve as many members as possible in support of our efforts. Many other organisations will be involved with us, including Rotary, local historical societies and the University of Western Sydney. I think it is safe to say that we expect to be involved in more community events this year than any other during our history.

John will be telling you about all these events as they unfold, as well as the exciting news that there has been a positive reaction from the UWS to our request for regular monthly nights at the Rotary Observatory. There will be another visit to MAS from the irrepressible Professor Fred Watson, which will be something to look forward to. Fred is well known as Australia's best science communicator.

Following a positive response to the survey of current subscribers to the *Prime Focus* mailout service, the mail-out service will cease in April and will not be available as an option with this year's membership renewals. The move to an electronic only *Prime Focus* continues - less printed copies will be available this year and although special cases may be considered, please remember to download your on-line version as soon as you get your electronic reminder.

With members getting used to an electronic *Prime Focus*, the Committee wants to encourage everyone to use the electronic Forum and Private Messaging (PM) facility and this will again be demonstrated to members by our Webmaster Chris Malikoff at this month's meeting.

The last meeting in November was attended by over sixty people, which is thought to be a record for the Society. The large roll up of visitors was mainly due to Dr. Madsen's talk being given some prominent publicity in the local press, supplemented in *The Advertiser* by a great wide-field image of the Milky Way, taken by Mohammed Baddah at Stargard. Thanks, Mohammed. I will be looking for more suitable member's photographs to supplement some of our occasional media statements throughout the next year.

The long-running issue of toilet facilities at Stargard has been (at least partially) resolved, so we hope this will help make life easier for the ladies who come along.

Despite many cloudy nights, a good number of members put the MAS into ChristMAS by visiting Stargard on several nights over the break. This was mainly due to John's very flexible approach to choosing the right nights based on medium-term weather forecasts!

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That's the number of years since Macarthur Astronomical Society was formed. We've come a long way since that first meeting was held on the fifteenth of January 1996 and have we must have held about 150 general meetings since then.

Black Holes Ain't Holes – Part 6

An essay on the problems perceived with the concept of black holes

Robert Zindler

(Editors Note: Robert Zindler has kindly offered the readers of Prime Focus sections of an essay he producing. Each month you will find the next extract from this essay.)

Peter Coles, *The new Cosmology*

Peter Coles, (*The new Cosmology*, Icon Books, 1998) writes:

"*Singularity* is a theorem proposed by Roger Penrose (and others) where the density of material became infinite (p 137)."

"Resulting from mathematical investigations, Roger Penrose devised the *singularity theorem(s)* (p 321)."

"A singularity can arise as a result of gravitational collapse (p 321)."

"The formation of a black hole from a massive mass results in a zero-dimensioned singularity with infinite density of *matter* (my emphasis) (p 137)."

"According to the famous singularity theories proposed by Roger Penrose and others, the inevitable result is a singularity, where the density of *material* (my emphasis)... becomes infinite (p 137)." and "For an object of any *mass* (my emphasis) M , there is a critical radius (R_s , the Schwarzschild radius) such that if all the *mass* (my emphasis) is squashed inside R_s , then no light can escape (p 137)."

Notes: These statements of *matter* and *mass* contradict the general cosmological concept that the singularity consists of, and represents, the hyper-properties of temperature, density (of what?) and gravity.

"*Schwarzschild solution* (read: the Schwarzschild radius) corresponds to a spherically symmetric distribution of *matter* (my emphasis) p 139)."

"Evaporation is the fate of all black holes (p 208)".

"The Schwarzschild solution, corresponds to a hole with a perfect spherical symmetry (p 321)."

Conclusion: A black hole is a spherical object.

"A Schwarzschild black hole is surrounded by an event horizon (p 322)."

"An *event horizon* forms around an object, ensuring that no communication is possible between the regions of space-time inside and outside the hole. No electromagnetic radiation can escape (p 207)." **Note:** In this context, the event horizon of the black hole is not a physical perimeter, but merely a demarcation between the *interior* of the black hole and its *exterior*.

Fred Adams and Greg Laughlin, *The Five Ages Of the Universe*

Fred Adams and Greg Laughlin, (*The Five Ages Of the Universe*, The Free Press, 1999) write:

"Supermassive black hole: Large black holes with millions to billions of *solar masses of material* (my emphasis) (p 214)."

"This generally accepted concept contains a contradiction as a black hole is defined as : A region of space-time in which the gravitational field is so strong that light cannot escape (p 207)."

Questioning theoretical physics

Tim Dean, Editor, (*Untying the strings*, Cosmos, Issue 16, Aug/Sept, 2007) writes:

"Physics may need 'a fresh perspective on things'. New answers to all those enigmas may come from a theoretician and are likely to be as challenging as they are enlightening (p 5)."

See also Peter Woit, *The Problem with Physics*, Cosmos, Issue 16, Aug/Sept.2007:

"Physics has become obsessed with strings, branes and multiple dimensions, yet the big questions remain fundamentally unanswered. Mathematical physicist Peter Woit thinks the time has come to admit these wild conjectures have failed, and move on (p 49)."

Also Paul Steinhardt: "Physics is ripe for a major revolution. Over the last decade, theorists have been stunned by the realization that our leading theory of cosmology (inflation) and our leading theory of fundamental physics (string theory) have each failed to deliver on their promises." and "The focus will soon turn to radically *revising* or totally *replacing* (my emphasis) either inflation or string theory, or both, with new combinations with unique and profound predictive power (p 54)." These notes do not specifically address black holes, but the authors strongly indicated the urgent need for new theories, both in particle physics and in cosmology. I concur and I propose to contribute to that idea.

Development of black holes: Retro-reasoning

In order to understand the concept of black holes, it may be useful to briefly explain the methodology employed by cosmologists to arrive at the concept of black holes: the thought-experiment called reverse or *retro-reasoning*. As a consequence of Edwin Hubble's discovery by 1929, by means of *redshift* measurements of light spectra from distant galaxies that the values of redshift increased with the distance of the observed galaxies, others subsequently concluded that the *observable universe* is expanding. It was then reasoned that the expanding cosmos is likely to become larger in the future, but must have been smaller in the past and even smaller in a more distant past. Taking this line of reasoning to a mathematically logical conclusion, this reduction in size of the entire cosmos must conclude in a single mathematical point – a cosmic *singularity* – a confluence of lines and therefore a human construct without any physical equivalent or existence. It was subsequently also reasoned that the entire cosmic mass transmogrified into energy according to Einstein's $E = mc^2$, and that this physical transformation must have resulted in hyper-qualities of infinite or near-infinite gravity, temperature and density of this cosmic singularity. These hyper-qualities subsequently allowed for the justification for the concept that these hyper-qualities provided the fundamental source for the generation of all cosmic matter in the big bang, again according to Einstein's $E = mc^2$. Full circle – problem solved! But was it?

Problems with retro-reasoning

There are at least four scientifically insuperable problems associated with applying this process of retro-reasoning to reducing the entire cosmos into a single point, putatively with hyper-properties.

Firstly: The hyper-temperatures, densities and gravity – and inevitably pressures – of the singularity have been calculated on the basis of the application of Boyle's law for gasses, with the assumed composition of the major part of the cosmos of hydrogen atoms and molecules – in other words, of a gas. Boyle's law states that when the volume of a gas that is contained in a vessel with a certain pressure and a certain temperature, is reduced to half the volume, then both the pressure and temperature of that gas will double; and so *ad infinitum*. Hence the putative singularity with the presumed hyper-qualities. But sufficiently compressed hydrogen becomes first a liquid and then a solid, and liquids and solids do not obey Boyle's law (see below).

Secondly: Ultimate compression – by whatever means – cannot result in the *super-position* of matter in the same place (i.e. the singularity point) at the same time, as this concept would violate *Pauli's exclusion principle*, which states (paraphrased): "No two...identical particles – two electrons, for example (or protons or neutrons) – can ever be in exactly the same quantum mechanical state." "Electrons – and other particles – cannot invade one another's space." (Scientific American Special Edition, April 2007)

Thirdly: A zero-dimensional, human construct, mathematical point, is an abstract or symbolic concept having no physical equivalent and therefore cannot exist in the physical reality.

Fourthly: Reduction of all cosmic matter into a point violates conservation law which prohibits *somethingness* – anything – to be reduced to *nothingness*, and prohibits *nothingness* to generate *somethingness* – anything. The reduction of the entire cosmos into a physically non-existing point-singularity, thus, violates conservation law.

Note: Zero dimensions of a singularity, equals nothingness and nothingness cannot exist.

Conclusions: The zero dimensional point-singularity with hyper properties cannot exist. The singularity cannot be a non-existent, zero-dimensional mathematical point, but, instead, it must manifest measurable physical properties such as dimensions in order to represent gravity, density, pressure and temperature.

It is clear that the pressures encountered in the big crunch – which I postulate precedes the next and now current expansion period of the cosmos – would have generated so much pressure due to the intrinsic gravity of the erstwhile cosmos that *the inflowing* cosmic matter results in the formation of a solid and growing cosmic core. This core subsequently expands into the now familiar cosmos.

Cosmological theoreticians have *borrowed* from physicists and mathematicians the concept of *retro-reasoning*. But as indicated before, this process has resulted in several problematic issues. As shown above, the reason for this serious problem rests in some flawed presuppositions and in fundamental errors in the reasoning process itself. This problem will inevitably lead to insuperable constraints on the development of a logically constructed hypothesis of the history and evolution of the entire cosmos which must obey natural laws, logic and self-consistency.

Liquid and solid hydrogen.

It must be noted, that hydrogen under extreme pressure behaves fundamentally different from that which is envisaged in black holes. The following information may be instructive.

At the close of the 19th Century, several scientists had predicted that hydrogen, when condensed, would become metallic. After all, it resides in the first column of the periodic table, with the alkali metals. Ordinarily, a gas... hydrogen can be cooled to a liquid (below 20 kelvin) and a solid (below 14 kelvin).

"...in the 1930's, physicists predicted that subjecting hydrogen to extreme pressure would cause molecules to dissociate – break apart into atoms – turning the substance into (solid) matter. In 1898...James Dewar liquefied hydrogen and a year later, solidified it. "In 1935 Eugene P. Wigner ...predicted that the ...diatomic molecular solid would transform as a metallic monatomic solid at sufficiently high pressure." "Our discovery of metallic hydrogen was serendipitous..." In the "models of the interior of Jupiter and Saturn...these gas giants are more than 400 times as massive as earth and much of their hydrogen exists in the form of metallic (super) fluid." "...planetary scientists theorized that Jupiter has...a core of metallic liquid hydrogen." (William J. Nellis, *Making Metallic Hydrogen*, Scientific American, May 2000, p 60)

Transmographication of matter into energy

In order to avoid the problems imposed on this process of retro-reasoning by Pauli's exclusion principle, it must have been assumed that a phase-transition must take place, where matter transmographies into energy. This raises a number of interesting questions:

- Does this transmographication take place before the event horizon, at the event horizon, in the 'space' between the event horizon and the singularity, or 'in' the singularity?
- Is this transmographication an instant process or does it take some time?

As this transmographication is assumed to be the result of pressure on the body of accreted or *inflowing* matter, it may, perhaps, be assumed that the event horizon may represent this transition phase from matter to energy. But this phenomenon requires a significantly sized region of compacting cosmic matter external to the event horizon, while pressure increases with increasing proximity to the event horizon, until matter suddenly changes into energy.

This too raises an interesting issue: the newly produced energy must then transit the black hole space until it 'accumulates' in the singularity, where it eventually reaches infinite or near-infinite values.

A related issue is the following. As the black hole increases in size with the increasing Schwarzschild radius, to include 'millions to billions of solar masses', this transit region between the event horizon and the singularity, must be increasing correspondingly and the transit time of the newly generated energy, must also increase correspondingly. Is this a realistic picture of what really occurs within black holes? All these issues are, of course, predicated on the assumption – and thus speculative pre-supposition – that all matter that is accreted by black holes undergoes this presumed 'phase transition from matter to energy'.

I postulate that during the preceding period of the pre-big bang 'crunch' less than one third of the entire cosmos is compressed into the ensuing solid cosmic core, before this core – for reasons which will be explained in a subsequent paper – expands into the newly expanding *total* cosmos, which the entire observable universe only forms a minor part, and is also expelled from the initial core and now progresses toward the eventual cosmic boundary.

Unexpected implication of retro-reasoning

Retro-reasoning, in effect, foreshadows the pre-existence of a massive cosmos *prior* to the present cosmos and if this is acceptable as a viable concept, then:

- The big bang did *not* herald the absolute beginning of the cosmos, but represented only the latest phase in an endless series of expansions and contractions and that the cosmos must be cyclic.
- The cosmos may have a finite size.
- The totality of the cosmos may have an infinite age as a discrete entity, even though all individual cosmic components are subject to continuous generation, existence, disintegration and eventual dispersal.
- The cosmos is surrounded and contained by *pristine* space-time which extends beyond the cosmos to infinity.

Prime Focus Article Submission

Deadline for article submissions for the February edition of Prime Focus is

Monday 9th February 2009

All Articles can be submitted via email cyberpiggy@optusnet.com.au
Or via snail mail to the MAS Postal address

MAS NEWS

"The Domes"

The President of Macarthur Astronomical Society, John Rombi, has called for Campbelltown Rotary Observatory to be the focus of Macarthur's contributions to the International Year of Astronomy next year.

The construction cost of approx. \$200,000 was funded by money raised from local organisations after a massive effort by Dr Ragbir Bhatl, Director of the Observatory & The Campbelltown Rotary Club, on the clear understanding that the Observatory would be used regularly for educating local school children and the general public, as well as for university research.

Mr. Rombi said that The Macarthur Astronomical Society had met recently with Rotary & Dr Bhatl and has again reaffirmed our willingness to participate in a monthly astronomical public outreach programme at the Observatory and pledged to work in conjunction with Rotary and UWS to this end.

Mr. Rombi said that it would be a calamity if the International Year of Astronomy passed us by without the main focus of events in Macarthur being the Rotary Observatory, right on our own doorstep at UWS.

SPEAKERS FOR 2009 (late changes to this program may occur)

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|----------------------------------|--|
| January 19th | Chris Malikoff (Webmaster M.A.S)
"Discussion on Website use" |
| February 16th | Ian Cook (Macarthur Astronomical Society)
Topic not known at this time |
| March 16th | Associate Prof. Geraint Lewis (University of Sydney)
Topic not known at this time |
| May 18th | Prof. Bryan Gaensler (Sydney University)
Topic not known at this time |
| June 15th | Bob Bee (Macarthur Astronomical Society)
"Mapping the Constellations with Mythology". |
| July 20th | Chris Malikoff (Macarthur Astronomical Society)
"Imaging with a Digital SLR" |
| August 17th | Dr Andrew Hopkins (Sydney University)
Topic not known at this time |
| September 26th | Prof Fred Watson (A.A.O)
Public Lecture & Observing Night, U.W.S Campbelltown
+ The Campbelltown Rotary Observatory |