

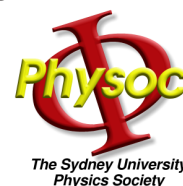
THE JEREMY

ISSUE 1, 2008

Reporting for Physoc



Socialising FOR PHYSICISTS



Welcome to the first issue of *Socialising for Physicists*, the guide that makes the potentially terrifying task of talking to normal people that much easier. In this series, we aim to show you the basics, whilst warning of the most common traps and pitfalls that plague physicists in social situations.

In this edition, general methods for dealing with normal members of society will be illustrated using real-world examples as a guide to how you might react to situations in your life. Remember: *socialising is not meant to be scary!* It's simply a way of communicating with your fellow man. Let us begin.



This is a common attempt at humour from someone who knows that you're a physicist. There are a variety of ways to respond:

a) *The nice guy*

Laugh with them and assure them that yes, Newton's laws still hold. This is a good way of turning the question into a conversation about *them*. Ask them where they learnt $F=ma$.

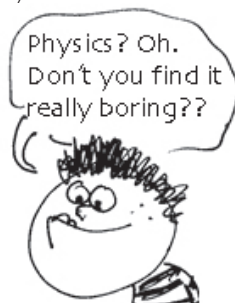
b) *The ignoramus*

Play dumb and ask them what $F=ma$ means. This genius tactic turns the nerdiness tables right around in a single move! *You'll have them teaching you about physics!* This is, however, a risky approach, because although physics graduates are known to have very little basic physics knowledge (only a wealth of knowledge about a single obscure area), $F=ma$ is probably pushing it. If you want to maintain your cover, certainly don't ask what the equals sign is. But by all means probe the intricacies of acceleration.

c) *The smart-arse wanker*

Respond by expounding the limitations of Newtonian physics. Be sure to make clear the historical evolution of thought in your answer, and try to include as much quantum mechanics jargon as possible. Supreme wankers may prefer to go for the additional challenge of mentioning Heisenberg's uncertainty principle in every

sentence. Prevent their gaze from straying into the distance by dynamically moving your head in the direction of their line of sight throughout the conversation. Follow them if they attempt to walk away.



Many of the wild population will not understand your motivation for studying physics. Again, there are three approaches:

a) *The nice guy*

Attempt to explain what it is that you love about physics. Mention general things that you find interesting without being too specific or sounding too nerdy: the nice guy approach is always inclusive. Try mentioning words like 'beauty' and 'fascinating', all the while monitoring their face for signs of boredom. Remember: be *succinct*. No one wants to hear you go on and on about your niche passion. The population mean interest length for such deliberations is 3 seconds.

b) *The sellout*

Admit that you don't really like physics. Tell them that they're right, it is boring and only nerds with nothing better to do study it. This strategy, whilst revolting to the ears of any pure-minded physicist, may be your only option if you're desperate to get on side with a harsh crowd. Be sure to change the topic from physics as soon as possible and repent for your sins when you get home by reading a Feynman lecture or two.

c) *The revenger*

Reply that physics is a fascinating science that is orders of magnitude more interesting than whatever they're doing with their life. Ask them what they do in a sharp, sour, and/or bitter tone of voice and proceed to aggressively enumerate the negative aspects of their life as opposed to the positives in yours. Be sure to mention the freedom of the academic lifestyle and the virtues of following your life's passion.



That old chestnut!

a) *The sensitive guy*

Run like a girl with your arms flailing into the corner of the room and have a private tantrum in the knowledge that you'll never have the respect of capitalists. Console yourself with the fact that you can mentally compute logarithms faster than anyone you know.

b) *The bullshit artist*

Tell them that science is the highest paid profession in the Southern Hemisphere. Make up statistics about mean pay levels and trends about the growing need for science and technology in the future. Tell them about the Federation Fellowship and how almost every graduate you know who's decent at science has at least one of them. Laugh at their attempts to gain money with their so-called 'finance degree'. Extra points for dropping in the line 'one day you'll be working for me'.

c) *The aggressive idealist*

Tell them that there's more to life than money and force them to sit through a long exposition on your love for physics and how virtuous you are relative to them. It is mandatory to call them a 'sellout' at least once.

You must be really smart, wanna sleep with me?



Ha! I always like to finish with a joke.

-Ben Fulcher

PHYSOC COMMITTEE 2008

Welcome! To the Physics Society for 2008! The following people have been appointed by the people for the people. I give you the Physoc Committee for 2008:

Silvy Choi - President



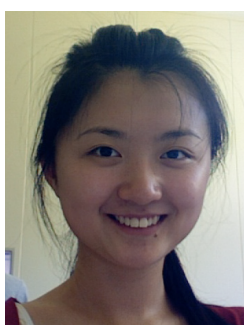
Silvy just completed her physics & maths major (yay!) and is finally a honours student in the Astrophysics department. In her spare time (when she's not looking up things about radio galaxies or running madly around like a headless chicken in the physics building) she enjoys feeding her narcissistic dragon while singing a faery lullaby under the shadow of her tree on the soft green grass.

Daniel "Menky" Naoumenko - Vice President



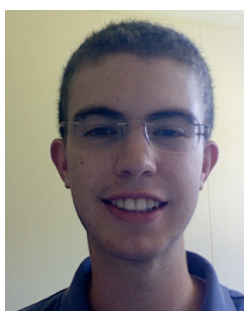
Daniel's casual stumbling through life as second year Science student landed him in Physoc, where he does his job with equal measures of enthusiasm and slight unease. He enjoys long walks on the beach and using locomotive metaphors to create illogical statements implying work being done. Trust your new vice-president to keep the traction magnets at Physoc running!

Vivian Jiang - Secretary



Vivian wishes she had blond hair and married to Mr Darcy. But instead she's a second year BSc student struggling with daily chores. You will often find her walking around the Physics building on her way to the girl's bathroom on the second floor. It's the only bathroom on campus with pink doors. She's also an enthusiastic HSC Physics tutor who loves writing on the white board. It gives her a sense of pride. Vivian thinks it's very hard trying to be witty. It took her 30 min to write the above passage.

Steven Kennedy - Treasurer



Hi everyone, I'm Steven, a second year science student doing a mixture of physics, mathematics, chemistry and geology. I enjoy playing the piano (though the same can't be said for those listening), reading about history and pretty much anything else as well. I look forward to meeting you all, unless I need to flee the country on embezzlement charges.

Matthew Wardrop - Webmaster



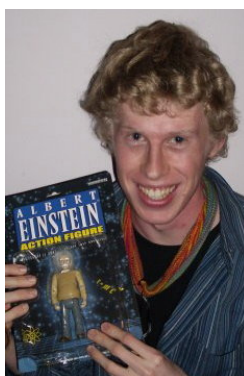
Matthew is a second year undergraduate student, who aspires toward Theoretical Physics. He has a deep seeded fascination with the world and the patterns thereof, which led him inexorably to science. Serendipitously, as it were, he became the web designer for Physoc, where he currently presides.

Francesca von Braun-Bates - Webmaster



Francesca von Braun-Bates (Frankie for short) is a second-year BSc (Advanced Maths) student intending to major in physics and pure maths. She is particularly interested in cosmology, relativity, quantum physics and schemes to get Stephen Hawking's job. Other pursuits include judo, skiing, reading SF, Latin poetry and a lot of Caesar and Machiavelli.

Ben Fulcher - Jeremy Editor



Hi guys. I'm a Jeremy editor for 2008. I won't beat around the bush: I'm extremely sensitive to people not writing in. If contributions are lacking, I'm likely to torture myself sadistically in the sick hope that causing myself pain will help me to overcome perpetual feelings of self-hate that circulate uncontrollably in my mind following the null result of a jeremy email check. Your contributions to this publication mean so much to both the quality of life of physics students and my mental health. I'm very, very sick, please don't let me down: jeremy@physics.usyd.edu.au

Felix Lawrence - Jeremy Editor



Felix Lawrence is a lesser nutjob of the nerd variety - his pastimes include scaring babies with the laws of thermodynamics, replying to text messages in haiku form, and scootering around uni yelling "wheeeee!". He is also a compulsive liar.

Duncan Sutherland - Outgoing President



Duncan "Mopes" Sutherland (Immediate past president, presently dogsbody, adviser to the president, roadie and general thug.) He was once a part of a vibrant School of Physics, running the Physics Society with his unique, laid-back manner. However, late last year he took the decision to defect to applied maths - what an arsehole! His hobbies include maintaining a grumpy demeanour, swearing and growing hair. When he isn't fretting about bubbles, he's probably eating a kebab. He is single and does look kinda cute in that photo....Room 483, Carslaw Bldg.

WHO IS JEREMY??

So... O-week, hey? You've toured all the stalls, collected as many free drinks as you could (sadly all of which were non-alcoholic), and are now back at your digs, and have stumbled upon Jeremy while sorting through the massive heap of paper on your floor; which you won't see again until next time you move house. Or maybe you've just freebased cocaine off the O-week strippers at the Thursday night party, and decided that now would be a good time to tuck into Jeremy. Or perhaps, my dear reader, you're sitting quietly on a bench above the front lawns, pulling out Jeremy as you wonder if you'll ever get an opportunity to use those free condoms you got from the SRC (hell, I was there once, dear friend - and look at me now! I'm an editor of Jeremy!).

Wherever you are, while you are reading this guff, you might be starting to wonder why this newsletter/rant space/home for tortured souls/august journal of physics is called Jeremy. Yes, it's a catchier title than Official Bulletin of the University of Sydney Physics Society (Physoc), but surely a more suitable name for a physics newspaper might be The Weekly Neville? The answer to this question that torments your mind, my dear, lies in the murky waters of a swamp in the Northern Territory.

Many solar revolutions ago, when Emeritus Professor Harry Messel was just a Professor, he was also a Head of School for the School of Physics. He was (and remains) "an outstanding person" [1]. Aside from such petty endeavours as pioneering computers in Australia, he also wrestled crocodiles. As I understand it, the School of Physics was developing small and robust radio transmitters for location tracking, and these transmitters needed to be tested in hostile environments. What more hostile environment, thought Prof. Messel, than around the neck of an NT crocodile?

So, for the glory of Priam, Prof. Messel dived into a croc-infested swamp, with a cigar in one hand and a radio transmitter in the other, picked the toughest, meanest and most infrequently publishing crocodile in the swamp, and swam at it quickly. The crocodile fought hard, its teeth spearing through the flesh on Prof. Messel's forearm, black blood dripping from its shiny teeth. It clapped its jaws around Messel's head, and would have sliced through his neck, had its teeth not caught on Messel's steel-threaded necktie; Messel then belched acrid cigar smoke into the crocodile's mouth, causing the crocodile to splutter and release him. The fight continued, as man and crocodile traded blows, but once the good Prof. had secured the transmitter around the crocodile's neck, and had finished smoking his cigar, his hands were free to teach the crocodile a

lesson. And teach he did - with his trademark gravelly flair; the crocodile was administered a lesson in 1st year thermodynamics. That crocodile was named Jeremy.

The program was a success, expanding to the Kimberley in WA, and Messel wrote and published two books [2,3] on the crocodile populations of the areas. Jeremy himself, enthused by the good Prof.'s charisma, went on to enrol in a BSc at USyd and founded this newsletter; but dropped out after one semester, failing all his exams due to the fact he couldn't write. Plans to develop deep-water-proof radio transmitters were shelved due to lack of interest, so Prof. Messel thankfully did not get an opportunity to wrestle a sting ray.

- Felix Lawrence

References

1. The Messel Endowment website http://www.physics.usyd.edu.au/messel/messel_professor.htm
2. Messel, H. Surveys of Tidal River Systems in the Northern Territory of Australia and Their Crocodile Populations, Pergamon Press, 1970
3. Messel, H. The Status of the Salt-Water Crocodile in Some River Systems of the North-West Kimberley, Western Australia, Dept. of Fisheries and Wildlife (Perth), 1977



Harry Messel with his characteristic cigar at hand.

DEAR JEREMY

Dear Jeremy,

I am about to start a degree at uni, and am thinking about eventually doing a PhD in physics. Do you have any advice that would help me out? Am I doing the right thing?

Yours Sincerely,

Eric Bananaman

Dear Eric,

A PhD is a wonderful thing: you can put "Dr." in front of your name, informercials will pay you to endorse their products, and it is a licence to wear socks with sandals. But we recently realised that the 7+ years of hard work and the 20 years of FEE-HELP debt associated with this level of education are unnecessary; you can achieve the same effect in 10 minutes at the Registrar's office. Simply change your first name to "Dr." by deed poll, and \$130 later you become a revered member of the community. I wish I had thought of this before I spent my last \$130 on coffee to keep me awake all night so I could work on my thesis...

Kind Regards,

Jeremy

Dear Jeremy,

I was running around in circles all day today, trying to write a letter to

your 'dear jeremy' column that would allow you to make a bad pun in reply,

Alan Peabody

Dear Alan,

What was the radius?

Jeremy

Dear Jeremy,

The above letter demonstrates that both you have a terrible sense of humour and that you are self-indulgently fabricating these letters. This magazine is shit!

Paul Bonaparte

Dear Paul,

With a name like Bonaparte, I put it to you that you were also made up. Are you aware that this makes you a massive hypocrite?

Jeremy

Do you have problems? Write in for free advice! jeremy@physics.usyd.edu.au

PHASCINATING PHYSICS

There's a lot of talk, but really, how hard is to get published in a peer-reviewed Physics journal? This column finds pleasure in the peer-review process.

A systems approach to appraisal mechanisms in emotion

David Sander, Didier Grandjean, Klaus R. Scherer

Neural Networks 18 (2005) 317–352

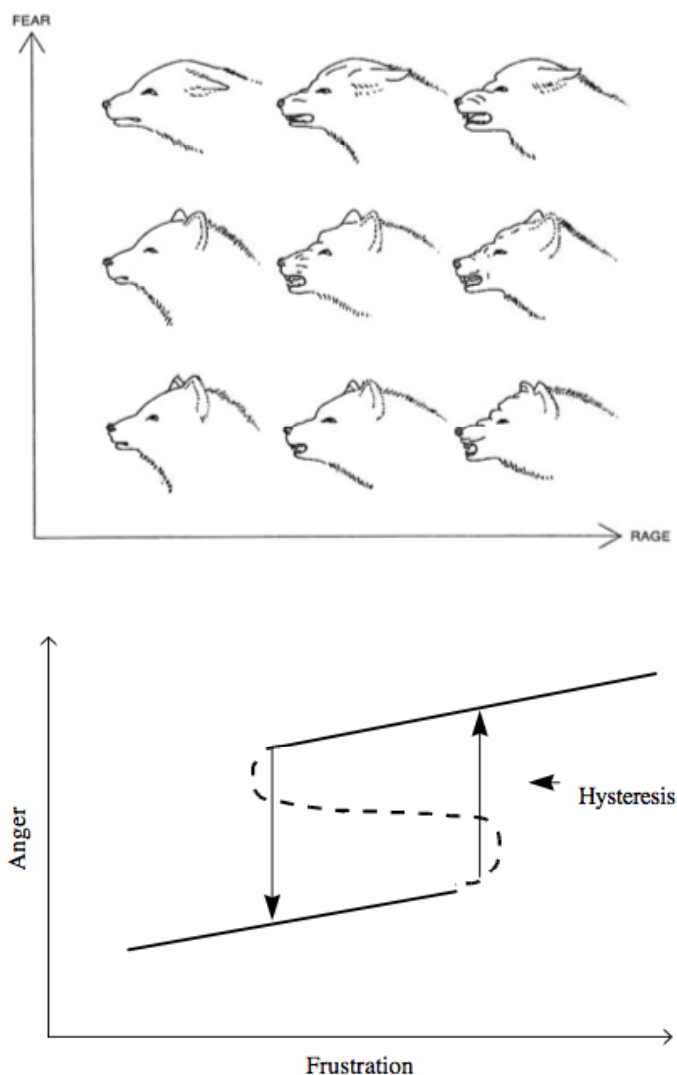
[from page 343]

Of particular interest to emotion theorists is the notion of hysteresis, which refers to a non-linear part of a function that is inaccessible and that doubles back in its course. Take an example shown in Fig. 4. The figure plots the relationship between the degree of frustration and the anger elicited by it. Whereas a linear function would predict steadily rising anger with increasing frustration, a hysteresis function predicts that the intensity of anger will change abruptly for specific degrees of frustration. This explains two important phenomena: (1) the observation that with increasing frustration there may be a point where anger will, in a dramatic fashion, jump to a considerably higher level, a sudden flaring up of anger (see also Lakoff, 1987, on anger metaphors); and (2) the well-known fact that the point of departure may be an essential predictor for the development of an emotion. For example, if I start out with little frustration, and consequently little anger, there is a point where rising frustration will make my anger jump to a much higher level without going through any other intermediate stages. However, when starting from a high level of anger, produced by high frustration, and calming down because of a diminution of frustration, it is not at the same point as in the other direction that my anger will suddenly drop. Rather, it will take much less frustration before a drop to the lower level will occur. This is explained by partial overlapping due to the fold in the function.

\\

The relevant figure is shown opposite. Other figures from the same paper are shown to the right. It's quite interesting, really, I can honestly say that I've never plotted in RAGE-FEAR space before. If you understand, agree, or disagree with any of this, please write in to jeremy@physics.usyd.edu.au

-BF



An illustration of hysteresis in the frustration-anger relationship.

PRESIDENT'S REPORT

by Silvy Choi



Welcome fellow lovers of physics to another year of uni! I can already feel the excitement, the enthusiasm and the thoughts that cross people as the first week approaches:

First years: "Oh crap! I don't know anyone AND I don't know what I'm in for!"

Second years: "Oh crap! I don't remember the stuff I've learnt last year AND it's the year that counts for SCIWAM!"

Third years: "Oh crap! I don't remember the stuff I've learnt for the previous years AND it's POTENTIALLY MY FINAL YEAR!"

Honours: "Oh crap! This year's going to be my most hectic year of my entire life AND I'm already procrastinating!"

PhDs: "Oh crap! I have to write a thesis AND there's a shortage of free food!"

Academics: "Oh crap! I have to teach these new undergrads AND do research!"

Whatever category you belong to however, Physoc is there for you!

We exist for one purpose. To create fun-filled environment for people studying physics so that uni life can be more enjoyable and bearable!

This year, Physoc will have a range of activities from "We Love First Years BBQ" to Trivia to Games nights (and other things that we can think of) as well as publish Jeremy (our loveable newsletter) once a month for your enjoyment and to help you procrastinate a little! We also have a website and a facebook (yay) group that you can visit and join.

Physoc has been around for decades (just ask your lecturers!) and we still have our traditional Quotes competition so enter any silly/funny remarks made by your favourite lecturers! Both you and your lecturer will win a prize!

So come to our events, be involved, let's have a fantastic year, and if you have any questions (that is NOT an assignment question) feel free to ask our friendly committee members (listed in this edition of Jeremy) - we don't bite, just nibble.

I'm off to feed my dragon now...

Silvy

PHYSOC TSHIRT 2008

Behind The Scenes: 2008 Physoc Shirt Poll

In early January, 2008's newly appointed Physoc president, Silvy Choi, issued a call for all willing Physoc members to submit designs for the 2008 Physoc shirt via Facebook. The popular web phenomenon did not disappoint, and by the end of submission time there were over twenty potentials waiting to be cut down. Deliberation by the Physoc executive committee narrowed the options down to five, and yours truly was responsible for tracking down a free web poll to determine the winner.

A suitable host was found, and the poll officially began. For those wondering, holding an internet poll to decide on a shirt design isn't a common occurrence in Physoc, and it was hoped that this democratic move would allow people from all over Physics to contribute to the decision. And sure enough, there was a great response from many involved with the School, including undergraduates, postgraduates and staff. Two shirts competed heatedly for the win, but the free web polling system (a trial version) broke down in the process! Switching to a new host saw the poll's completion, with Penguin Diagram narrowly defeating Schrodinger's Cat.

However, scrutinising voters within Physics noted that a victory of two votes in a non-preferential system was not conclusive enough for the poll

to be declared over – so, for those lovers of polls, a final poll was devised to decide the shirt design from those final two. Again the response was great, and again, not surprisingly, the tally of votes showed both shirts fighting neck and neck for the lead. Finding something universally appealing was going to be a big ask, but we had hoped for a convincing victory of sorts!

In the end, Penguin Diagram only just pulled home by four votes, winning 42:38. We acknowledge that both scores are within a standard deviation of each other; but by then I think even the poll-lovers had decayed into poll-haters! Time was also an issue, and so with that Physoc's voyage into democracy had ended, with the official ruling of the 2008 shirt design: PENGUIN DIAGRAM.

It will be sold by friendly Physoc members during O-Week – keep an eye out for it! As the winner of the 2008 shirt design poll, the story behind Penguin Diagram is also featured in this issue of Jeremy for those who want to know more.

-Vanessa Moss

The Story Behind: The Penguin Diagram

The first question we should answer here is: what is a penguin diagram? The strange picture featured on the 2008 Physoc shirt is part of a family of figures known as Feynman diagrams, after famous physicist Richard Feynman who originally conceived them. Feynman diagrams are used as a tool to visualise particle reactions such as scatterings and decays, which occur subject to various rules that must be obeyed. Drawing a Feynman diagram can give you an idea of what kind of reactions can and can't happen – if you can't draw a Feynman diagram for a particular reaction, you're in trouble!

An interesting note about Feynman diagrams is that the axes of the diagram represent space and time, meaning that special particles (known as anti-particles) travelling anti-parallel to the time axis are actually going "backwards" in time! The exact mechanics of this awaits those who choose to do particle physics at high levels.

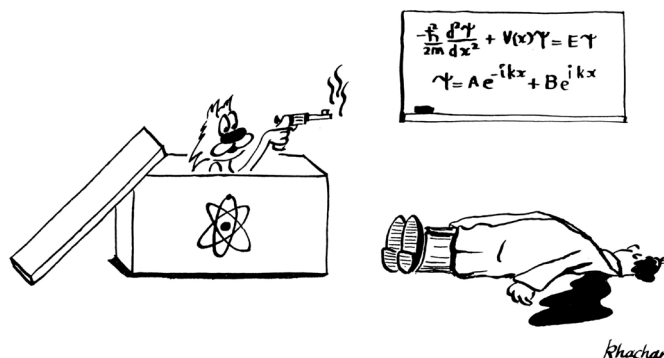
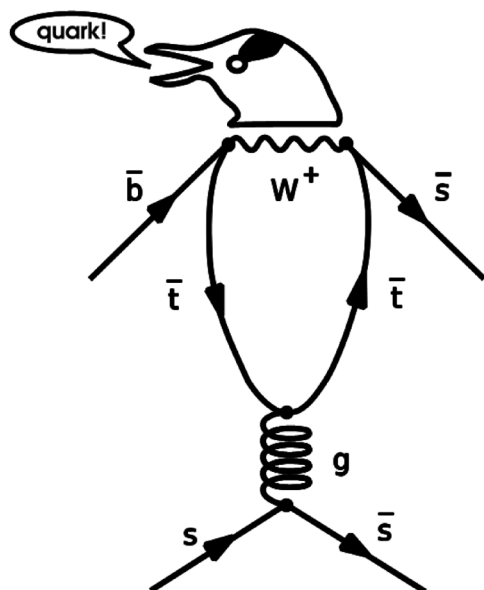
As for the story behind the penguin class of these, history traces it back to a theoretical physicist named John Ellis. In the late 1970s, Ellis and some fellow physicists were out at a pub during which the decision to play a fateful game of darts was made. Ellis entered against CERN student

Melissa Franklin, who left during the game to be replaced by physicist Serge Rudaz. Ellis ended up losing to Rudaz (and felt he also 'lost' to Franklin), the consequence of which was the punishment of incorporating the word 'penguin' in their next paper – a paper including the topic of b-quark (bottom quark) mass.

Through questionable means he finally became convinced that the humble Feynman diagrams they were dealing with did, under the 'right light', resemble penguins (of sorts) – and hence, with the publishing of their paper in the following months, the penguin diagram was born! There are a few different versions floating around, and you might be interested to know that the most popular internet version is actually wrong (which we discovered and fixed after we were informed the Physoc shirt had fallen victim to purporting the erroneous version). The diagram featured on the 2008 Physoc shirt is correct, so long as the time axis does some twisting around the penguin's happy feet.

And there you have it – the 2008 Physoc shirt has not only great physics but interesting history behind its design!

-VM



Finally ... Schrodinger opened the box

PUZZLES!!

Fusing Physicists

Each week we blend the face of physics students with a particular physics staff member. This week I give the treatment to three Honours students of 07: myself, Anthony Krensel, and George Brawley. Your job is to work out which member of the Physics staff we've been blended with. Answer next week. Suggestions for people to blend in the future are welcome at jeremy@physics.usyd.edu.au



Equation Spot the Difference

Ever wondered how the radiation field in the mode M in a medium can be calculated? Or something like that. Anyway, this week's equation is taken from the brilliant **Electromagnetic processes in dispersive media** textbook by D. B. Melrose and R. C. McPhedran. This is the book that encouraged me to give up on novels. Anyway, your task, as always, is to determine which is the correct equation and determine the inane and obvious differences between the two equations. The amount of maths/physics you know will determine how many differences there are. Interpret as you will! Nerdy responses regarding ambiguities are welcome: jeremy@physics.usyd.edu.au

a)

$$\mathbf{A}_{M\text{rad}}(t, \mathbf{x}) = \frac{i^3}{2\epsilon_0} \int_{-\infty}^{\infty} d\tau \int \frac{d^3\mathbf{k}}{(2\pi)^3} \frac{R_M(\mathbf{k})}{\Omega_M(\mathbf{k})} \mathbf{e}_M(\mathbf{k}) \mathbf{e}_M^*(\mathbf{k}) \cdot \frac{d}{dt} \mathbf{X}(\tau) e^{(-1)^{3/2} \{ \omega_M(\mathbf{k})(t-\tau) - \mathbf{k} \cdot [\mathbf{x} - \mathbf{X}(\tau)] \}}$$

b)

$$\mathbf{A}_{M\text{rad}}(t, \mathbf{x}) = -\frac{i\mu_0 qc^2}{2} \int dt' \int \frac{d^3\mathbf{k}}{(2\pi)^3} \frac{R_M(\mathbf{k})}{\omega_M(\mathbf{k})} \mathbf{e}_M(\mathbf{k}) \mathbf{e}_M^*(\mathbf{k}) \cdot \dot{\mathbf{X}}(t') e^{-i\omega_M(\mathbf{k})(t-t') + i\mathbf{k} \cdot [\mathbf{x} - \mathbf{X}(t')]}$$

Physoc Notice Board

"We Love First Years" BBQ/General Meeting (GM)

Friday 7th March 2008 from 12pm-2pm @ the roof of the Physics Building (Main)
Come! It's FREE!

First Year Officer Position Available!

Do you enjoy meeting and interacting with people? Are you a first year student studying physics? Yes & Yes? Then apply NOW for the First Year Officer Position either at the Physoc stall during O-week or via usydphysoc@gmail.com! First Year Officers are responsible for connecting first year students and Physoc - through them we let the first years know about our events and activities, and through them the first years let us know what they want from us :D

Next Issue!!

- * How to build a nuclear reactor in your backyard
- * More advice 'for physicists'

Please write in with any letters, questions, complaints, random rants, or anything else. The quality of this magazine is such that we'll publish anything, try us. The aim is to be a social outlet for physics students, so if there's anything you want to let out, let it out on us! jeremy@physics.usyd.edu.au



RALPH'S
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