



**Australian Institute of Physics
NSW Branch (April Public Talk)**

“Mr Tompkins Goes to the Races”

**Dr Donald Lang
Macquarie University**

Tuesday 27th April 2010 @ 5.30PM

At the

Slade Lecture Theatre, School of Physics, University of Sydney

Public talk arranged by: The Australian Institute of Physics (NSW Branch)

Entrance is FREE

Summary of talk:

Many introductions to Special Relativity somewhat frivolously suggest applying the Lorentz length contraction to catch and stable a relativistic racehorse in a stall that is a bit short for it. The horse is brought home from track work, at speed, and gallops into the stall, which is open at both ends. As the rump gets in the back door, the all-important nose has not yet come out the front door and the doors at the ends are closed simultaneously. There are some difficulties, including not being able to use the same stall, or horse, a second time. For a simpler model the horse is replaced by a long slim metallic knitting needle. The stall can be replaced by a postal mailing tube. The needle at rest must be longer than the tube, at rest. The tube should of course be transparent. Now comes a psychology of physics experiment. You are reminded of the impractical treatment of the horse. You are invited to contemplate the needle aligned with and travelling at high speed along the centre line of the mailing tube. Following that line should take it inside, through, and out along the length of the [open-ended] tube. Now, can it in fact be shown mathematically to be simultaneously entirely within the tube? It is reasonable to imagine a camera, with sufficiently speedy technology out to one side from the middle of the tube. Can it take a series of photos showing the passage of the needle? Can these include a photo with the needle completely inside the tube? Next transfer attention to an observer keeping pace with the needle. That observer also carries a camera, and passes by the other one on the photo stand. Both cameras are busy. If there is a shot in the first sequence as described, with the needle entirely inside the tube, add a little extra technology so that the second camera passes by and takes a photo there simultaneously. An invitation is then extended to assert that the resulting sequence of shots with a camera “in passing” must include something showing the knitting





needle, all of it, through the transparent side of the mailing tube. By observation many physicists willingly accept the idea of the first camera and the special photo sequence to be obtained from it, until they are asked about the second camera, and usually go back to change their earlier answer(s). It is intended to resolve the perceived paradox. Working on an earthbound track with relativistic horses and observers would create problems for their trainers. For the original Mr Tompkins, trained by George Gamow, a line of telegraph poles by the side of a road was perceived as spaced like a picket fence. It is intended to improve on that. Technology of a relativistic Melbourne Cup photo finish is considered. Some thought applying to these details will be invited. Those extra problems that would follow from breeding a horse to be named Tachyon, capable of outdistancing light on any linear course, will be mentioned.

Brief Biography of the Speaker:

Donald Lang was born in the first third of the twentieth century, in the short interval after the rise to power of Adolf Hitler and before Franklin D Roosevelt came to power. He studied physics and mathematics to MSc level in Auckland and moved to the ANU to obtain a PhD in theoretical nuclear physics. He has worked, mostly on statistical properties of nuclei, in research laboratories and universities in the United States and also

at AERE Harwell in the UK. He returned to Australia to join the AAEC, which has since been transformed into ANSTO. Nominally retired, he maintains his interests in the public image of ANSTO and in laboratory supervision of students entering physics studies in Macquarie University.

Detailed Schedule for Tuesday, 27th April 2010:

- **5.30-6.30 pm LECTURE by Dr Donald Lang.**
- **6:35-7.00 pm REFRESHMENTS, Slade Lecture Theatre.**
- **7.00-8.00 pm LECTURE by Dr Chris Stewart.**
- **8.15 pm DINNER with the Speakers at Buon Gusto (Italian), 368 Abercrombie Street, Chippendale.**
E-mail Dr Fred Osman (fred_osman@exemail.com.au) if you will be able to join us for dinner.

Travel Directions:

- Train to Redfern station and walk to the **School of Physics**.
- Buses 422, 423, 426, 428, 448, and 450 from Circular Quay to City Road / King, or 412, 435, 438, 470, 483 etc. along Parramatta Road from Circular Quay.
- Drive and park in various parking lots. You will need to pay for parking (**\$6 flat-rate after 4 pm**) and display the ticket in your car. You may also find parking places on public roads outside the Uni.

Event sponsored by:



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