

# Rutherford – an inspiration to young New Zealand Scientists



Mark Kruse (Duke University)

# Partial transcript of conversation over coffee outside of R1@CERN yesterday afternoon



- ☞ *Colleague:* “So are you here for ATLAS Upgrade week ?”
- ☞ *Me:* “Yes, partly, but I’m also giving a short talk at the Rutherford centennial Colloquium tomorrow afternoon”
- ☞ *Colleague:* “Ah, I think I saw something about that – what are you going to talk about” ?
- ☞ *Me:* “How Rutherford is an inspiration to New Zealand physicists”
- ☞ *Colleague:* “Why New Zealand physicists – he wasn’t even from New Zealand ”
- ☞ *Me:* (with a cold incredulous stare) “He bloody well was from New Zealand.....”

(next 10 minutes recounting what I know of Rutherford’s life and work)

- ☞ *Two similar conversations since then !*

# We know Rutherford's journey from NZ...



- ⌘ Not too dissimilar from many other current NZ physicists
  - ⌘ *My own*: from U. of Auckland (B.Sc., M.Sc.); to America as a grad student then postdoc working at Fermilab; and now faculty at Duke University (NC) working on ATLAS
- ⌘ Many others listed at:



**Kiwi Physicists Abroad**

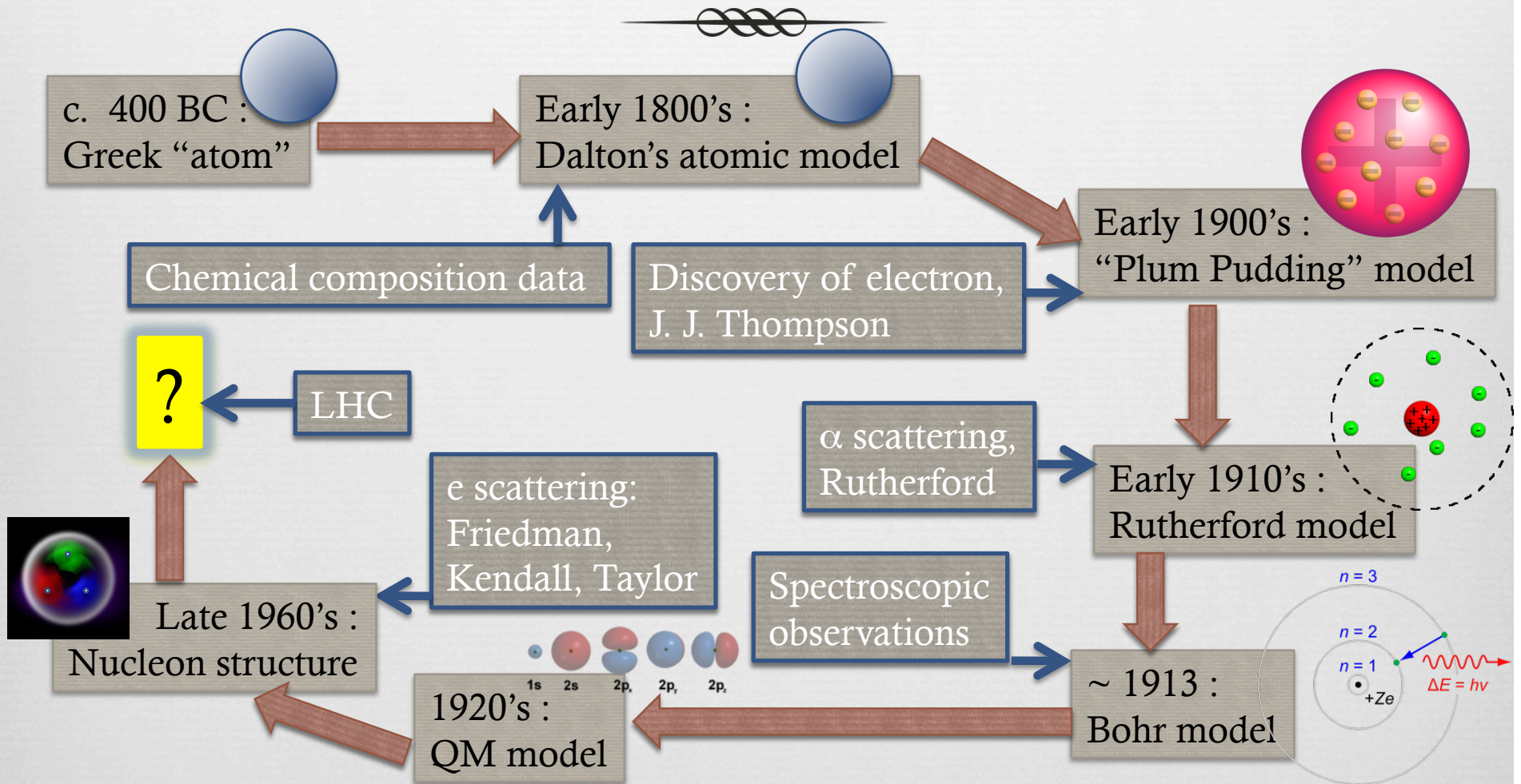
**"Intellectual Capital - NZ's most valuable export"**

The primary purpose of this web page is to provide contacts for New Zealand physicists and especially physics students who may be considering going abroad to further their physics research including graduate school.  
All the physicists listed below have agreed to provide information if asked.

[North America](#) / [Europe](#) / [Asia - Australia](#) / [South America](#) / [Graduate Students](#) / [Scholarships](#) / [Repatriated](#) / [Other Information](#)

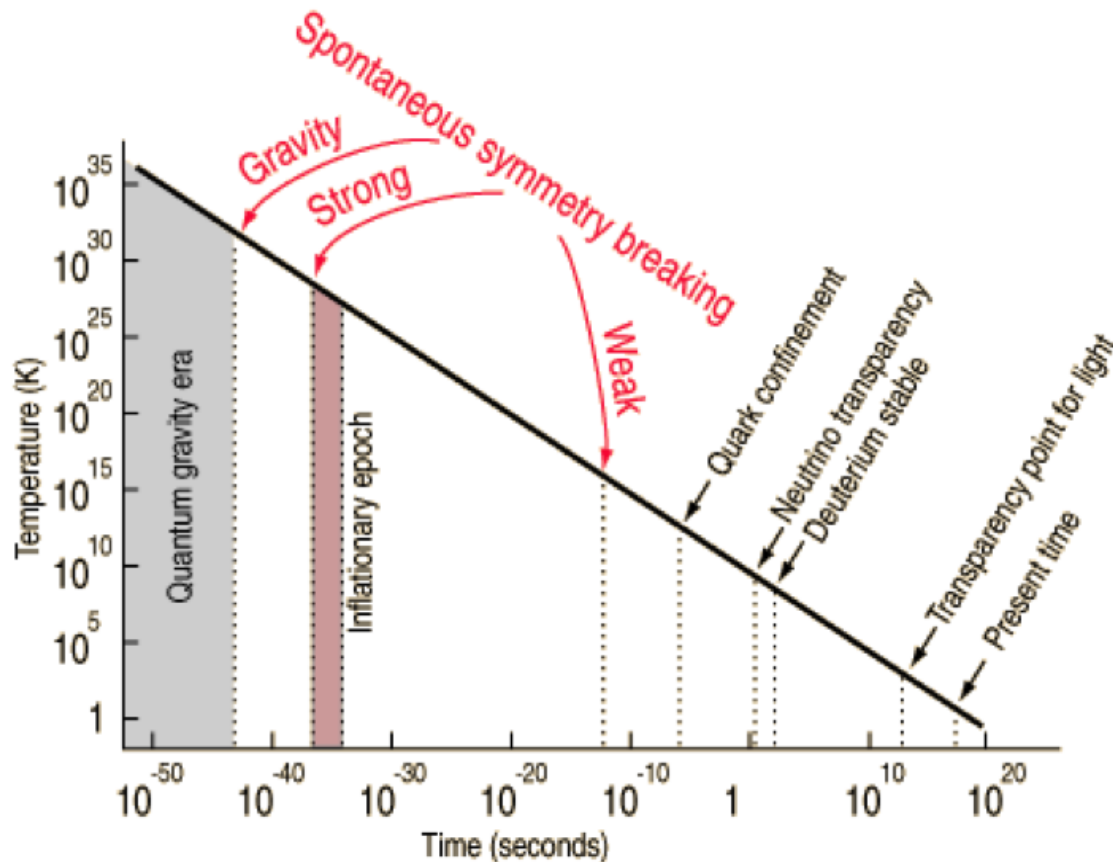
- ⌘ And like Rutherford, all that I know of proudly identify themselves as New Zealanders regardless of how long they've been abroad, and even though NZ couldn't provide them the same opportunities

# Recap: a brief (and selective) history of our understanding of atomic structure



∞ Theories and models are forced to change through new experimental results

# Energy comparison: Rutherford's $\alpha$ -scattering to the LHC



Timeline of the Universe (Kaufmann, 1991)

- ☞ Rutherford was probing the structure of the Universe about a second after the BB ( $kT \sim 10$  MeV)
- ☞ At the LHC we are probing times of about  $10^{-14}$  s ( $kT \sim 10$  TeV)
- ☞ Are we also about to challenge the way we now think of the Universe ?

# Rutherford as an inspiration to all New Zealanders



- ↻ New Zealand is
  - ↻ Small – about 4 million people
  - ↻ Young
  - ↻ Isolated



- ↻ So New Zealanders that make an impact on the world become very proud “possessions”
- ↻ Most New Zealanders won't know many details of Rutherford's scientific achievements, but most will name Rutherford as their most recognisable scientist.

# Rutherford as an inspiration to New Zealand Physicists



- ∞ Many of us become physicists because as students we were inspired by someone who showed us how to think differently
- ∞ For me it was a bit later as a physics undergrad at Auckland that I started to learn more about and to appreciate Rutherford
  - ∞ How to think like a physicist
  - ∞ Making things work “from nothing” -- the “NZ way” ?
    - ∞ Necessity is the mother of invention
  - ∞ For NZ physicists Rutherford is someone we can directly relate to (albeit without realising the same achievements!)
- ∞ Left NZ (at 23) and forced the world to think about the structure of the Universe in a completely new way

# Final words



- ❧ Rutherford was an inspiration to all physicists
  - ❧ He would have a question of Nature, then he would find the most ingenious ways to ask it such that the answers revealed a whole new side of Nature
- ❧ He was also a product of New Zealand which I believe greatly influenced his approach and success
- ❧ Students of physics can learn a lot about how to really be a physicist by studying Rutherford