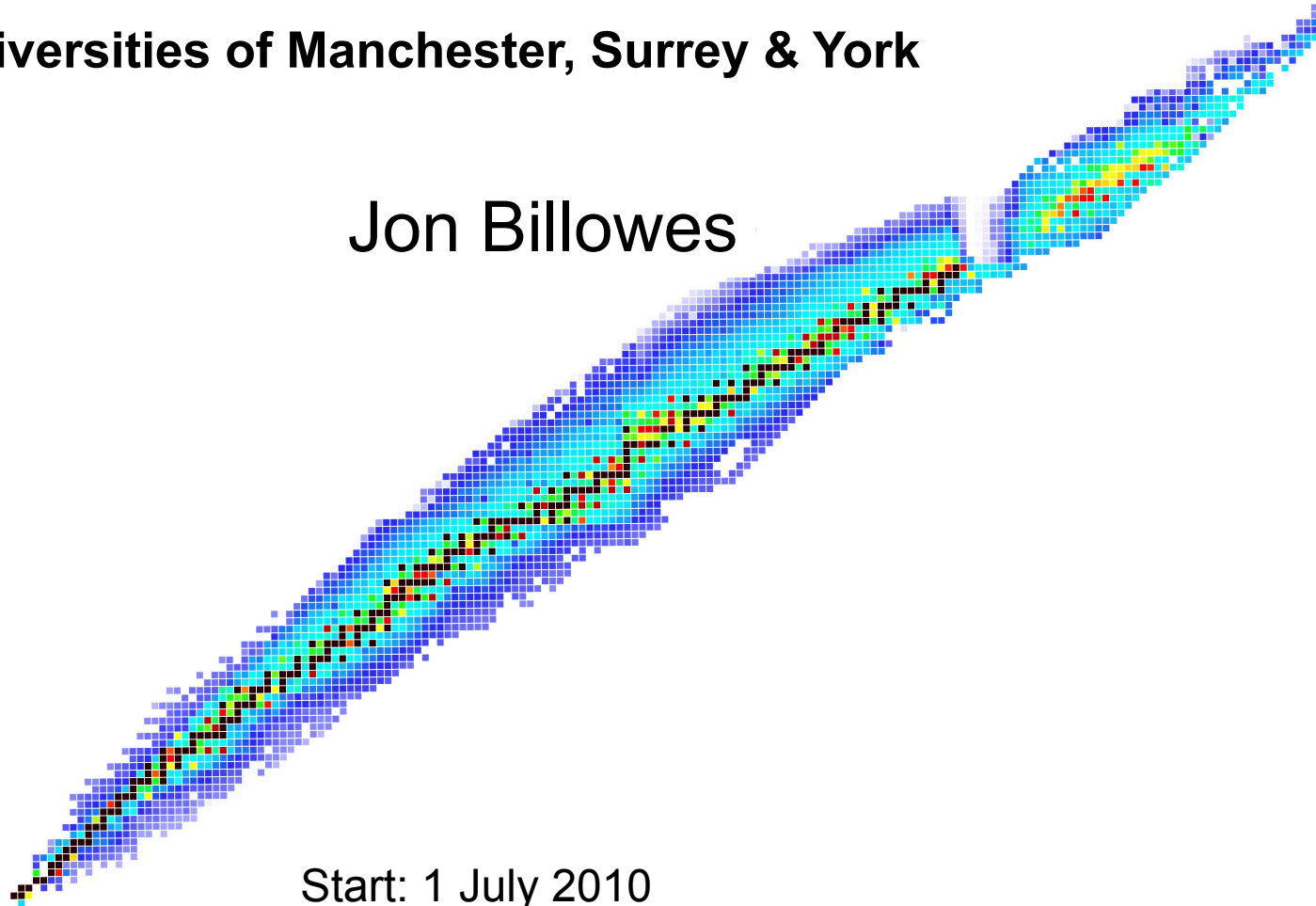


EPSRC grant for *Nuclear data: fission yields, decay heat and neutron reaction cross sections*

Universities of Manchester, Surrey & York

Jon Billowes



Start: 1 July 2010

End: 30 June 2014



Extended to 31 July 2015

Strand 1 *Neutron capture cross section measurements at nTOF, CERN*

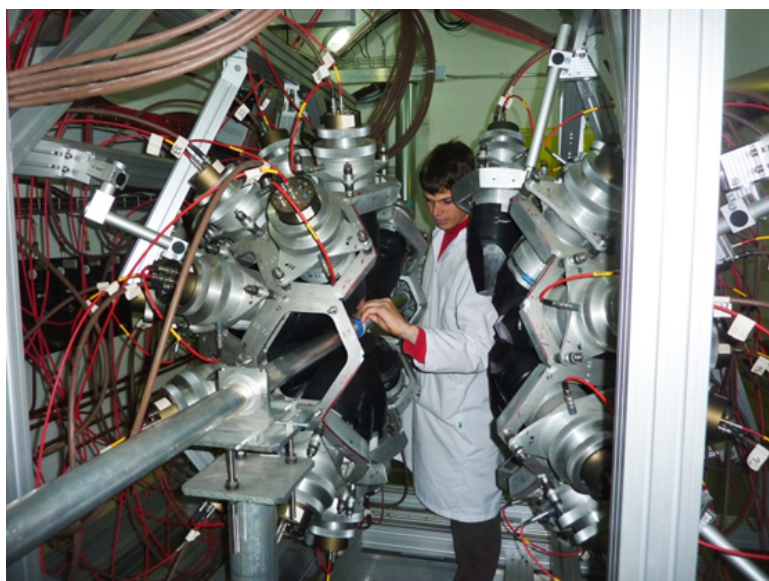
Gavin Smith, Jon Billowes (Manchester) David Jenkins (York)

PhD studentship (York) - Mark Vermeulen – Writing up

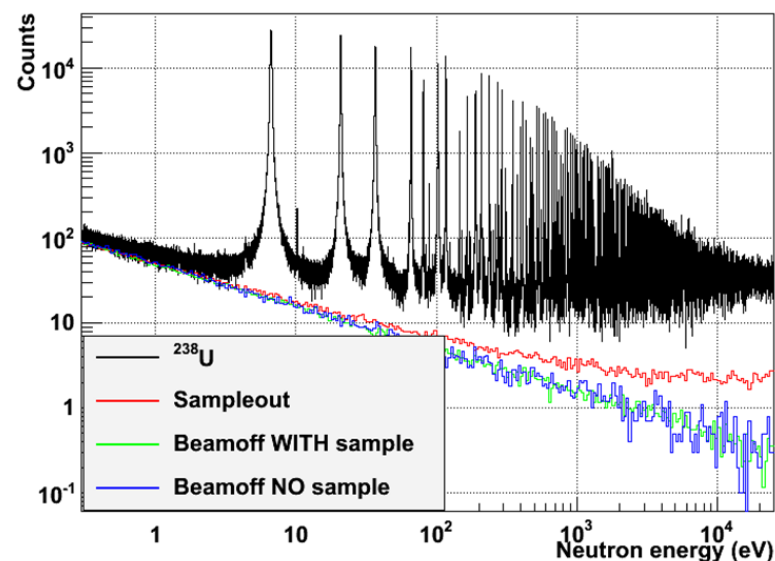
NDA Bursary (Manchester – Toby Wright – Completed 2014 (now CERN)

Subscription for nTOF facility (Manchester & York)

NEA request to measure $^{238}\text{U}(n,\gamma)$ cross section with 2% accuracy from 100 eV to 25 keV



*Hands on work at the n_TOF facility,
CERN measuring a ^{238}U sample*

**University involvement:**

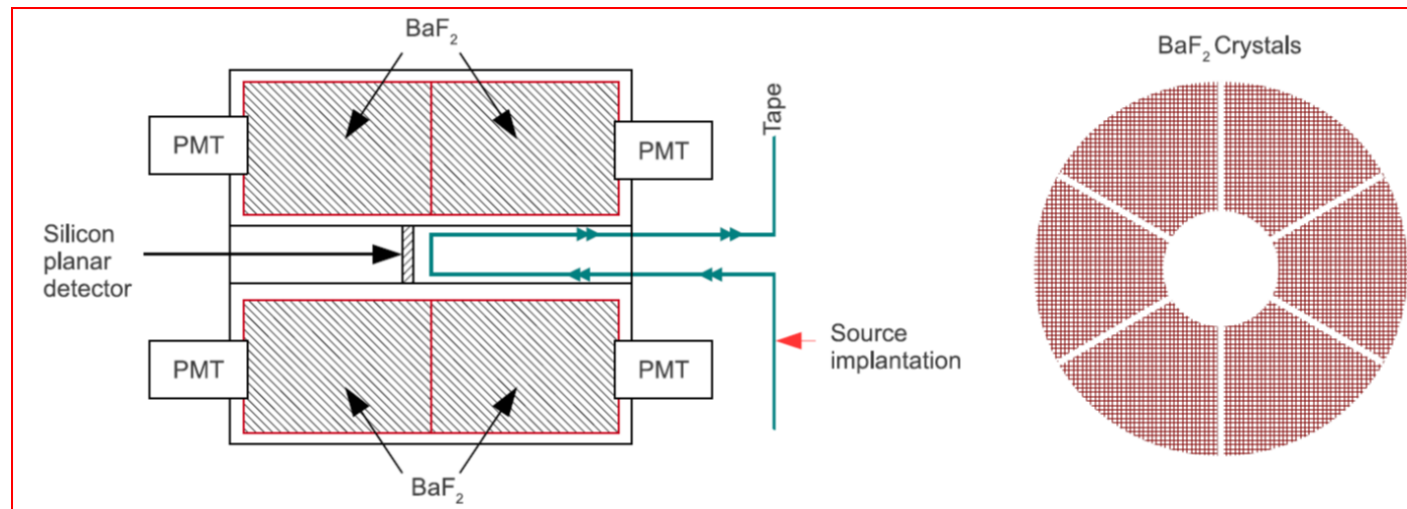
- **Manchester** – $^{238}\text{U}(n,\gamma)$ measurement (above)
- **York** – $^{236}\text{U}(n,\gamma)$ measurement

Strand 2 Decay heat measurements of fission fragments with a TAS

Paddy Regan, Zsolt Podolyak (Surrey), Gavin Smith (Manchester)

PhD studentship (Surrey) - Simon Rice – Completed 2014 (now AWE)

Decay heat measurements for “Priority 1” nuclides identified by WPEC:
 ^{101}Nb , ^{105}Mo , $^{102,104,105,106,107}\text{Tc}$, ^{86}Br , ^{91}Rb , and ^{94}Sr



TAS:
Total
Absorption
Spectrometer

Unique features of Jyväskylä Accelerator Laboratory, Finland:

- “IGISOL” ion source – provides even refractory elements in 1 ms
- Penning trap – can separate isobars (and even isomers) by exact mass and deliver to TAS detector

Strand 3 *Neutron fission cross sections and yields with STEFF at GANIL*

Gavin Smith (Manchester), Paddy Regan, Zsolt Podolyak (Surrey)

STFC studentship (Manchester) - Andy Pollitt - Completed 2013 (ILL)

EPSRC (Nuclear FiRST) - Lizzie Murray - Writing up

EPSRC (Nuclear FiRST) - Robert Frost

EPSRC (Nuclear FiRST) - Stuart Warren

EPSRC (Nuclear FiRST) - James Ryan

Toby Wright – PDRA based at CERN (FP7)

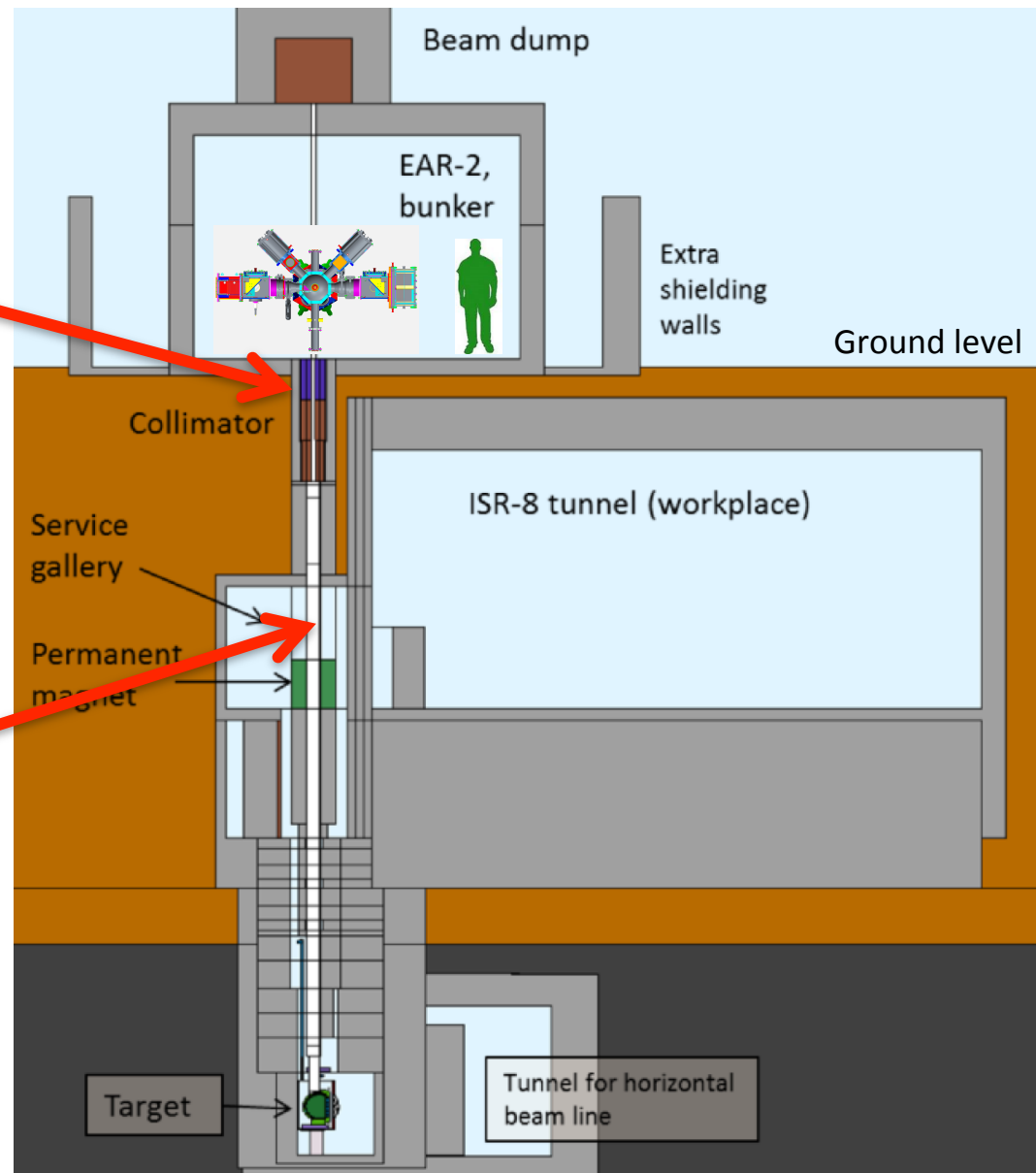
Construction and upgrade of STEFF (Spectrometer for exotic fission fragments) for deployment at GANIL Neutrons for Science Facility (NFS)

Change of plan – NFS has been delayed, but a higher neutron flux facility now available at CERN.

The initial STEFF experiment has been approved by CERN.

Installation and commissioning in 2015.

Experimental Area 2 now being commissioned 2014



Future beyond EPSRC grant?

Manchester

- STFC is providing some T&S, technical support, and 50% of n_TOF subscription (first time STFC has supported this area of applied nuclear physics)
- FP7 project and group funds provides PDRA support

York

- No funding so far

Surrey

- STFC providing some T&S and some PDRA support (shared) for further reactor decay heat measurements.
- NDA Bursary (2014) for fission fragment decay data (student recruited)
- NPL links (with Paddy Regan, Gavin Lotay) in decay heat spectroscopy