

# The UK 850 MHz Solid-State NMR Facility

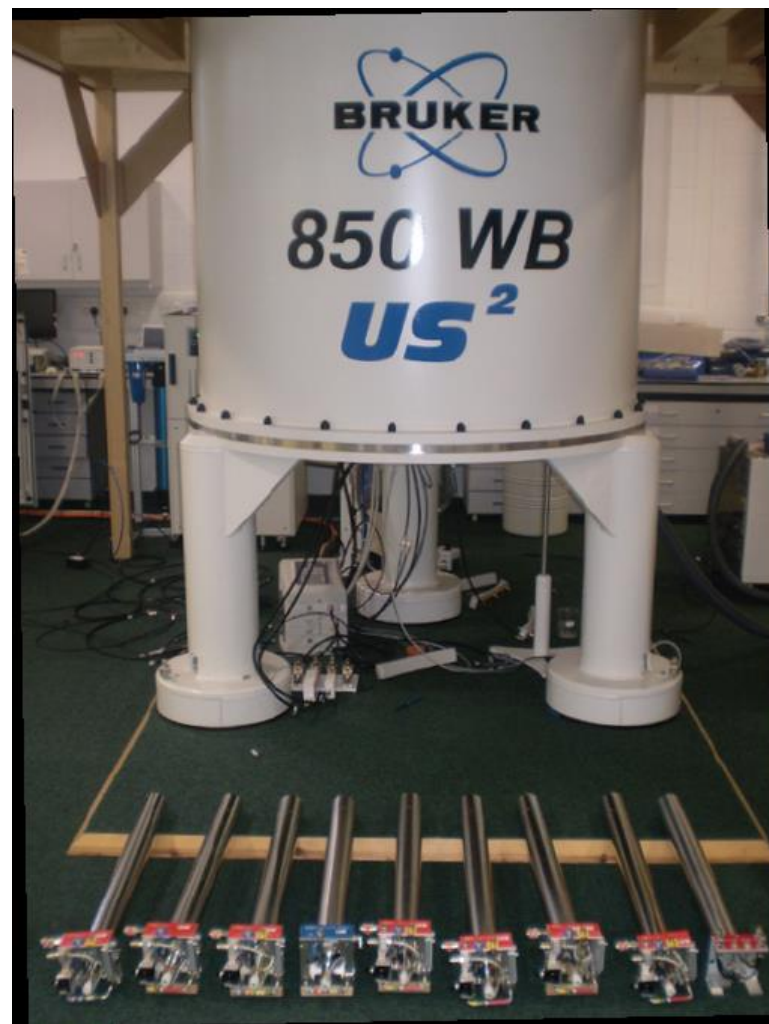
In 2010 – 2015 period: **1816** days have been  
allocated to **48 PIs** from **23** different UK  
institutions with **2666** days being requested

<http://go.warwick.ac.uk/850mhz/>

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## PROBES

1. 1.3 mm HXY (+19F)
2. 2.5 mm HXY DBB
3. 2.5 mm HX (+19F)
4. 2.5 mm HFX
5. 3.2 mm HXY DBB
6. 3.2 HXY low E field
7. 3.2 mm HXY
8. 4 mm HXY
9. 4mm HX (low gamma)
10. 7 mm X (low gamma)
11. Static
12. DOR probe
13. JEOL 1mm HX



# Sample Rotation

Rotors	Volume
DOR	17 $\mu$ l
7 mm	230 $\mu$ l
4 mm	50 $\mu$ l
3.2 mm	40 $\mu$ l
2.5 mm	14 $\mu$ l
1.3 mm	1.5 $\mu$ l
1 mm	0.8 $\mu$ l



# Tuning Range

- Capability to make measurements on any NMR-active nucleus between  $^{103}\text{Rh}$  (27.1 MHz) and  $^{31}\text{P}$  (344.1 MHz), as well as  $^{19}\text{F}$  and  $^1\text{H}$ . To date  $^{31}\text{P}$ ,  $^7\text{Li}$ ,  $^{119}\text{Sn}$ ,  $^{87}\text{Rb}$ ,  $^{11}\text{B}$ ,  $^{71}\text{Ga}$ ,  $^{65}\text{Cu}$ ,  $^{23}\text{Na}$ ,  $^{27}\text{Al}$ ,  $^{13}\text{C}$ ,  $^{79}\text{Br}$ ,  $^{93}\text{Nb}$ ,  $^{45}\text{Sc}$ ,  $^{69}\text{Ga}$ ,  $^{59}\text{Co}$ ,  $^{127}\text{I}$ ,  $^{29}\text{Si}$ ,  $^{77}\text{Se}$ ,  $^2\text{H}$ ,  $^6\text{Li}$ ,  $^{139}\text{La}$ ,  $^{17}\text{O}$ ,  $^{133}\text{Cs}$ ,  $^{137}\text{Ba}$ ,  $^{15}\text{N}$ ,  $^{35}\text{Cl}$ ,  $^{91}\text{Zr}$ ,  $^{33}\text{S}$ ,  $^{14}\text{N}$ ,  $^{43}\text{Ca}$ ,  $^{95}\text{Mo}$ ,  $^{67}\text{Zn}$ ,  $^{25}\text{Mg}$ ,  $^{89}\text{Y}$ ,  $^{39}\text{K}$ ,  $^{99}\text{Ru}$ ,  $^{87}\text{Sr}$ ,  $^{183}\text{W}$ ,  $^{73}\text{Ge}$  have been measured.
- A large number of triple resonance (H)XY combinations are possible, using either the DBB probes or an appropriate choice from among the large range of probe inserts available. Possibilities include:  $^{29}\text{Si}/^{15}\text{N}-^2\text{H}$ ,  $^{13}\text{C}/^{14}\text{N}-^2\text{H}$ ,  $^{23}\text{Na}/^{14}\text{N}-^{29}\text{Si}$ ,  $^{27}\text{Al}/^{14}\text{N}-^{29}\text{Si}$ ,  $^{11}\text{B}/^{17}\text{O}-^{29}\text{Si}$ ,  $^{11}\text{B}/^{29}\text{Si}-^{23}\text{Na}$ ,  $^{31}\text{P}/^{17}\text{O}$ ,  $^{31}\text{P}/^{29}\text{Si}-^{23}\text{Na}$ ,  $^{31}\text{P}/^{13}\text{C}-^{11}\text{B}$ ,  $^{31}\text{P}/^{71}\text{Ga}$ ,  $^7\text{Li}/^6\text{Li}$  To date triple resonance combination measured:  $^1\text{H}-^{19}\text{F}-^{13}\text{C}$ ;  $^1\text{H}-^{13}\text{C}-^{129}\text{Si}$ ;  $^1\text{H}-^{13}\text{C}-^{17}\text{O}$ ;  $^1\text{H}-^{13}\text{C}-^{15}\text{N}$ ;  $^1\text{H}-^{13}\text{C}-^{35}\text{Cl}$ ;  $^1\text{H}-^{13}\text{C}-^{14}\text{N}$ ;  $^1\text{H}-^{13}\text{C}-^{43}\text{Ca}$ ;  $^1\text{H}-^{15}\text{N}-^{17}\text{O}$ ;  $^{31}\text{P}-^{71}\text{Ga}$ ;  $^{31}\text{P}-^{27}\text{Al}$ ;  $^{31}\text{P}-^{23}\text{Na}$ ;  $^{31}\text{P}-^{13}\text{C}$ ;  $^{31}\text{P}-^{17}\text{O}$ ;  $^{31}\text{P}-^{43}\text{Ca}$ ;  $^7\text{Li}-^{17}\text{O}$ ;  $^{71}\text{Ga}-^{17}\text{O}$ ;  $^{27}\text{Al}-^{17}\text{O}$ ;

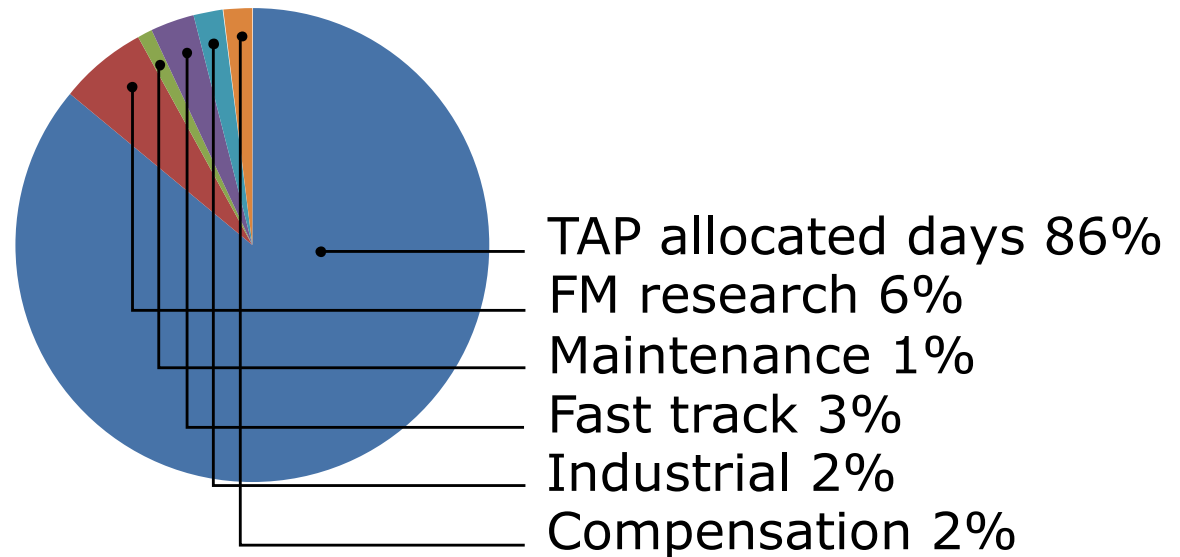
# VT-capabilities

- Bruker specifications for the 3.2 mm, 4 mm and 7 mm probes is between  $-140\text{ }^{\circ}\text{C}$  and  $+150\text{ }^{\circ}\text{C}$  while for the static probe is between  $-150\text{ }^{\circ}\text{C}$  and  $200\text{ }^{\circ}\text{C}$
- To date, users have performed experiments down to  $-100\text{ }^{\circ}\text{C}$  static;  $-80\text{ }^{\circ}\text{C}$  MAS and up to  $+116\text{ }^{\circ}\text{C}$  MAS (sample temperature  $+178\text{ }^{\circ}\text{C}$ ).
- The facility ordered an HX 4 mm probe for higher temperatures  $-120\text{ }^{\circ}\text{C}$  and  $+300\text{ }^{\circ}\text{C}$  operational in summer 2017.

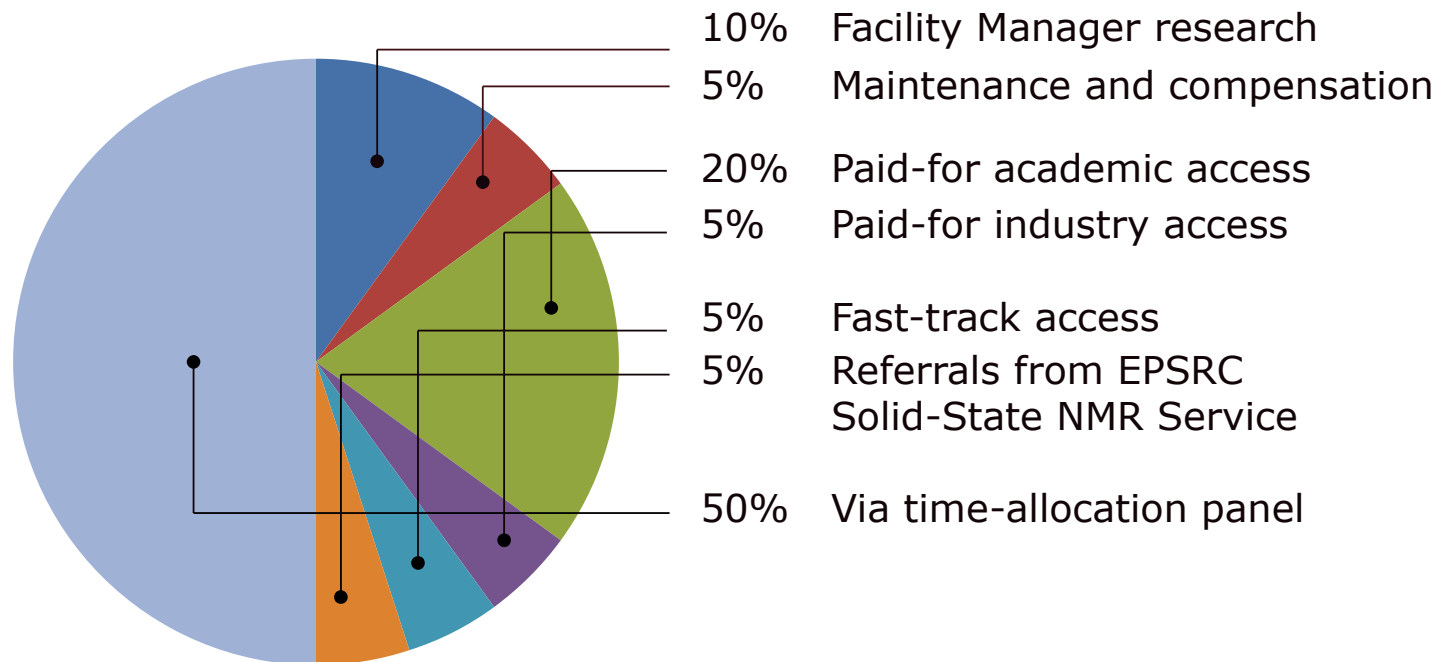
# Time Allocation 2017

- Two calls for applications per year (October 30<sup>th</sup> 2016, April 30<sup>th</sup> 2017)
- 85% of spectrometer time is allocated by the Time Allocation Panel

Spectrometer time January 1<sup>st</sup> - December 31<sup>st</sup> 2015



# User Access to the Facility (2018, 2019)



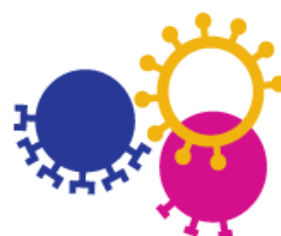
- For 2018 and 2019 academic users are encouraged to apply for grant funding to meet an access charge of £1129 / day (unless VAT exemption for medical research applies)

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