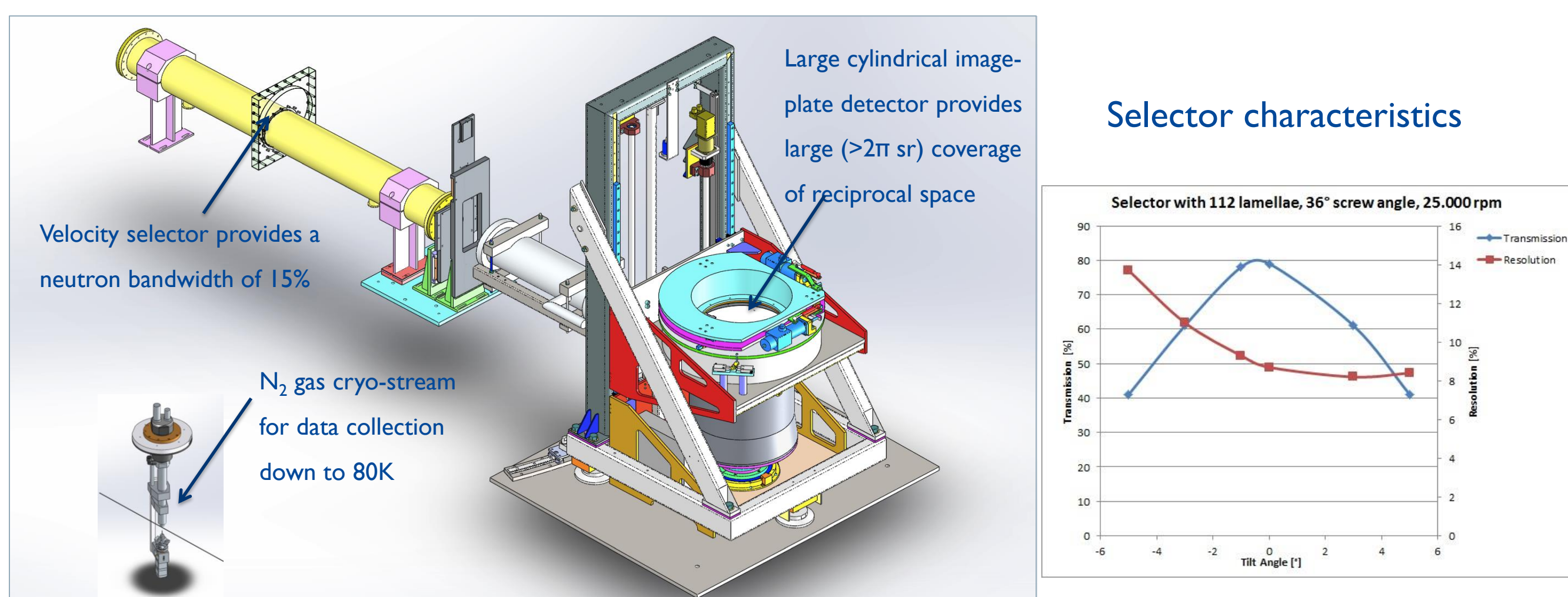


DALI – Extending the capacity and capability for neutron macromolecular crystallography

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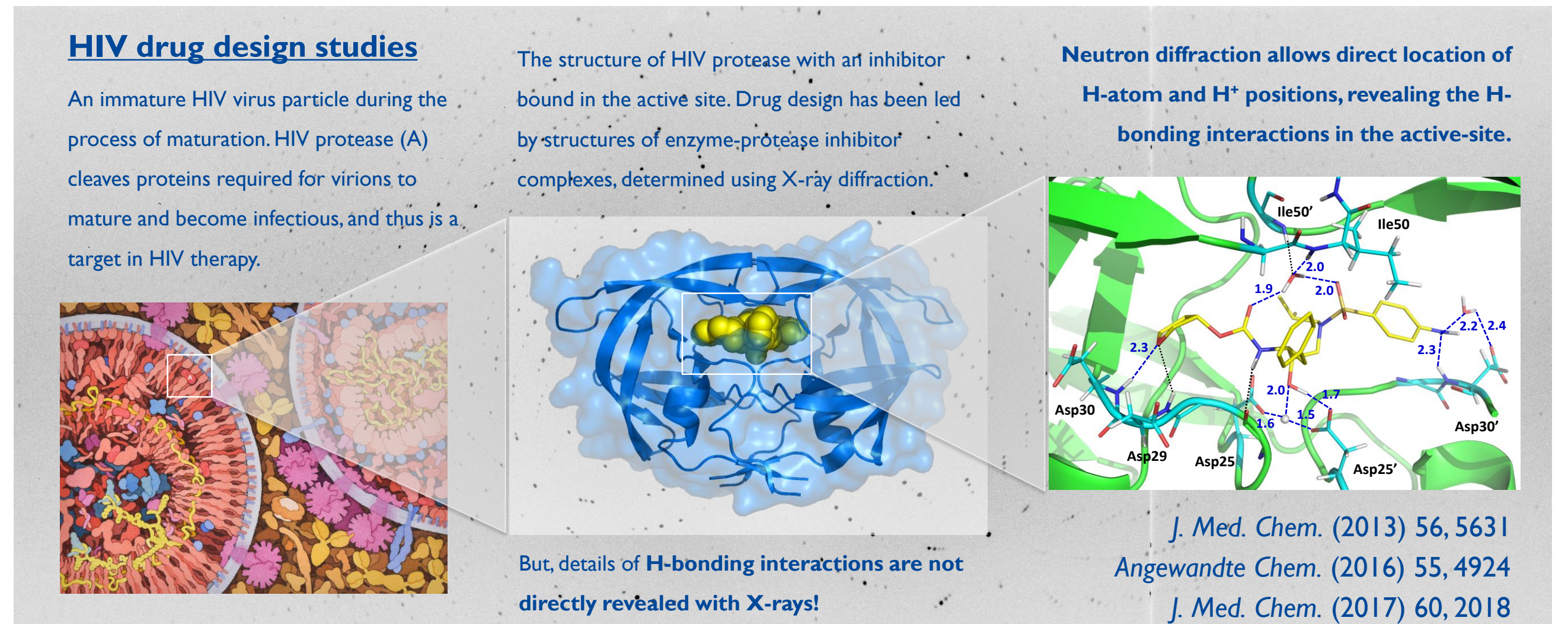
THE INSTRUMENT

- DALI will extend the range of systems to those with larger unit cells ($>100\text{\AA}$)
- Combines quasi-Laue data collection with a large cylindrical detector
- Utilizes a narrower neutron bandwidth ($\delta\lambda/\lambda=10\%$) compared to LADI ($\delta\lambda/\lambda=30\%$)
- Data collection will be possible at room- or low-temperatures (down to 80K)



THE SCIENCE

- H-atoms & protons (H⁺) play key roles in numerous biological systems and processes
- Knowledge of their positions is essential e.g. in elucidation of enzyme mechanisms and for improving drug-design
- Neutron crystallography is the only approach to locate mobile H-atoms/protons and without radiation damage issues

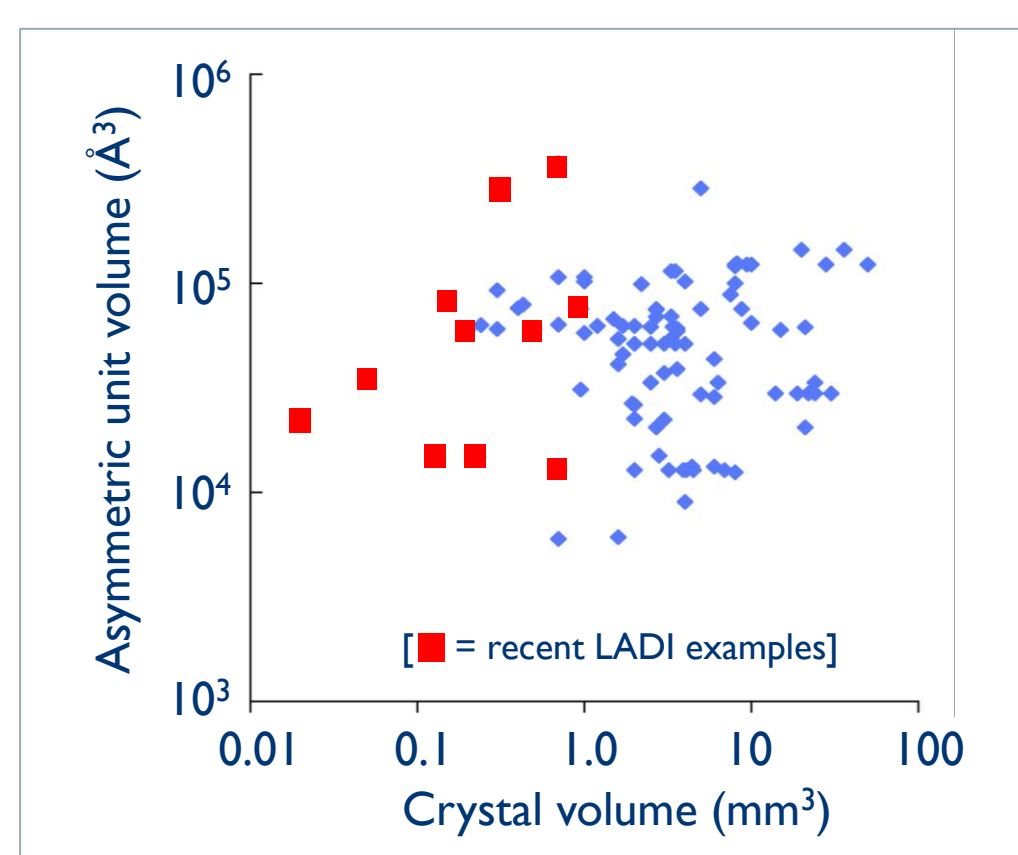


AN EXPANDING FIELD

- Improvements to LADI at H143, along with new instruments online (MLZ, ORNL etc) has led to an expanding field with **>50% (86/166) structures determined since 2015**
- Number of proposals, days requested and overload rate **all increasing for LADI**

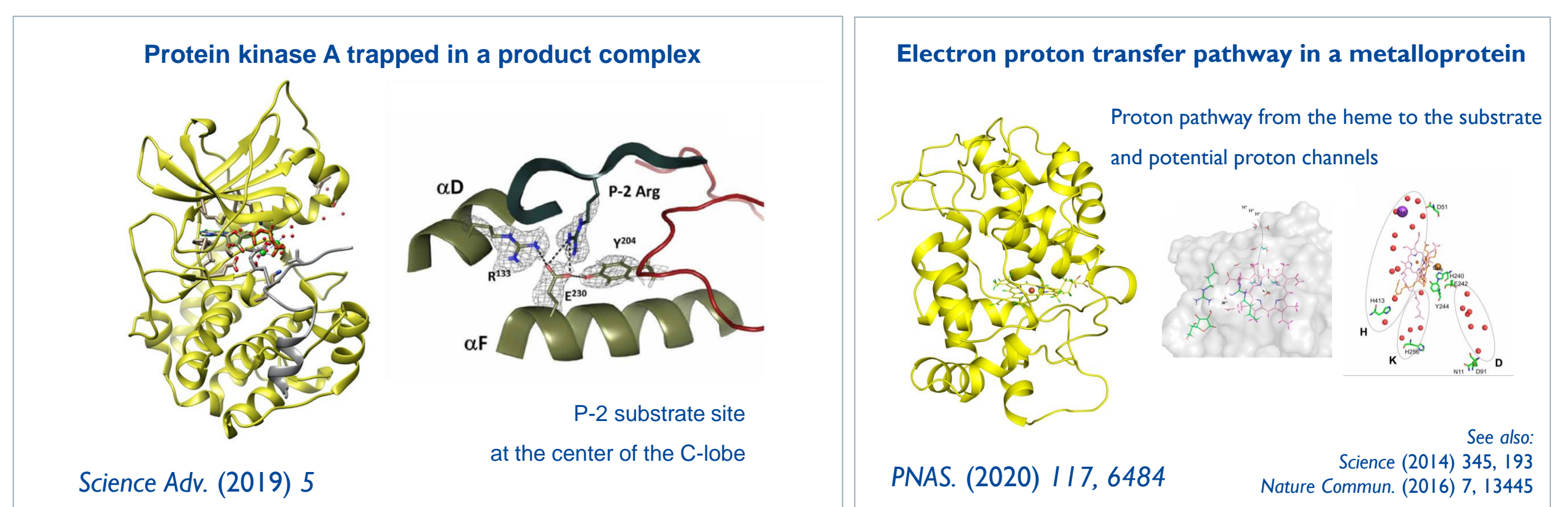
Year	Proposals	Days requested	Overload
15/16	50	713	2.9
17/18	35	478	2.3
19/20	50	379	3.4

- LADI continues to be world-leading e.g. most structures [36], largest cell [125kDa], lowest crystal-to-cell volume ratio [15×10^{-4}], fastest data collection [14h]



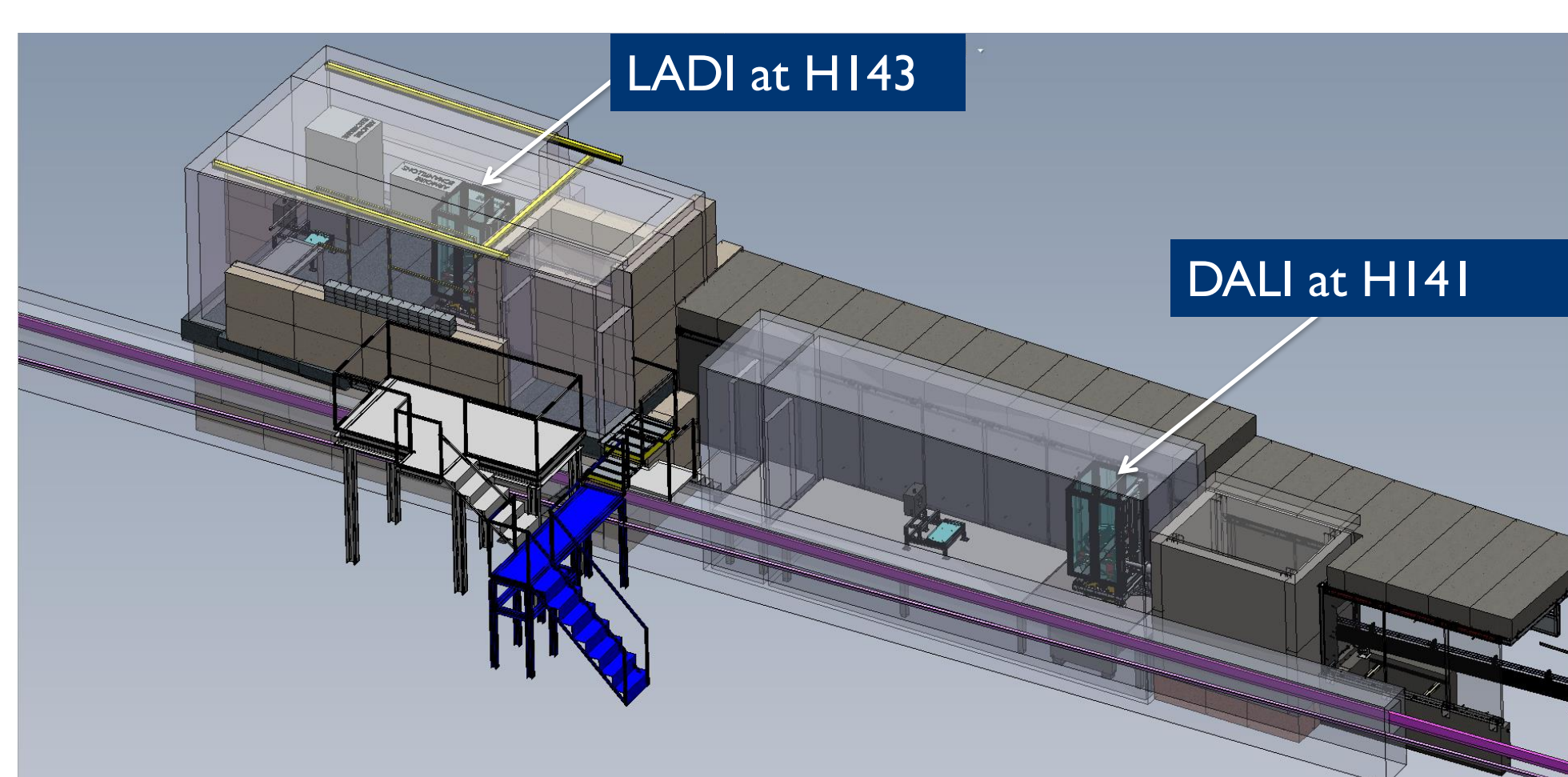
HIGH-IMPACT

- Results are often medically relevant and of high-significance
- Reflected by publications in high-impact journals e.g. Science, Nature Commun., Angewandte Chem.
- Average impact-factor per publication = **6.8**



DALI SITING

- DALI will be sited in front of LADI at the end-position of cold neutron guide H141
- Planned to be in place for **commissioning by the last cycle of 2020**



EXTENDING THE LIMITS

- DALI will allow us to do extend the capacity and capability for neutron MX
- Reduced bandwidth of DALI (cf. LADI) will (i) **improve data completeness for large cells** (i.e. 80 - 100Å on edge) and (ii) allow us to **extend the limits to >100 Å on edge**

