



31st March 2012
Symposium Honouring
Sherwood



I still remember when we first met..

**3th International Conference on
Advanced Technology and Particle Physics
Villa Olmo, Como 22-26 June 1992**

← 20 years ago!



A prototype monolithic pixel detector *

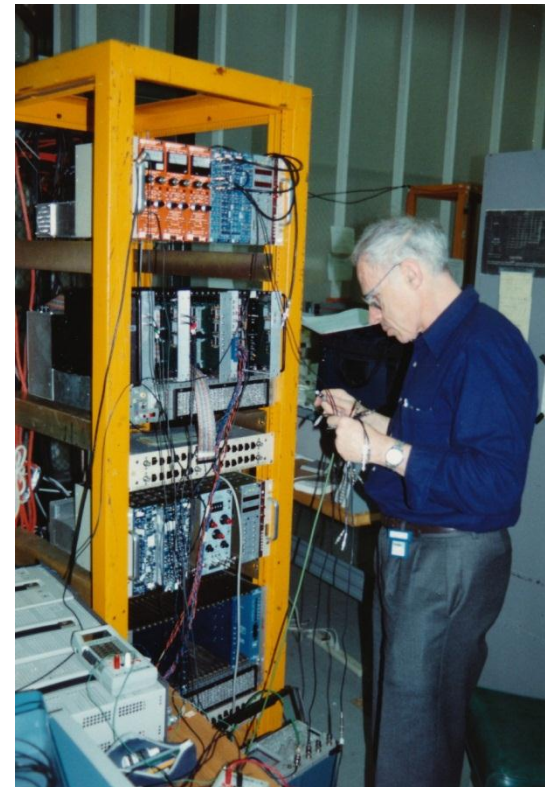
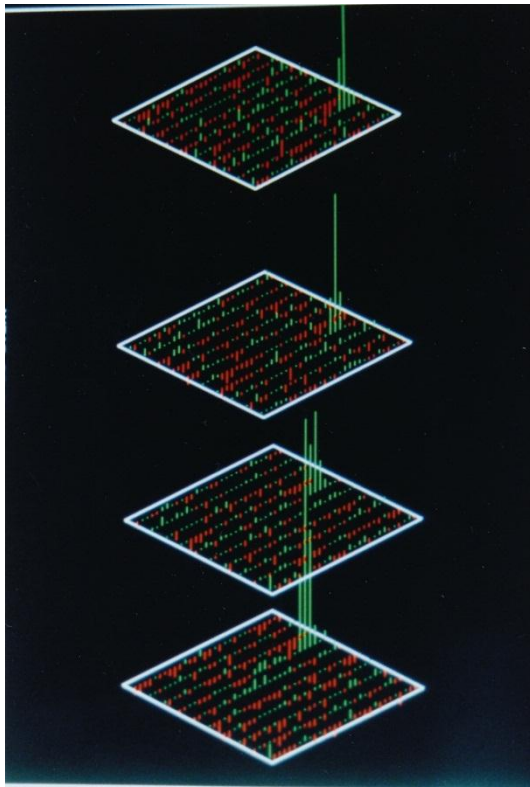
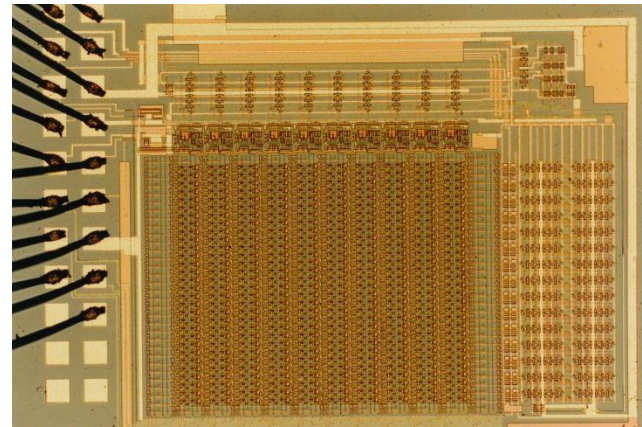
**Christopher J. Kenney ^a, Sherwood I. Parker ^{a,*,*}, Vincent Z. Peterson ^a, Walter J. Snoeys ^{b,1},
James D. Plummer ^b, Chye Huat Aw ^b**

^a *University of Hawaii, Department of Physics, Honolulu, HI 96822, USA*

^b *Center for Integrated Systems, Stanford University, Stanford, CA 94305, USA*

Wow!!!!

*Monolithic Sensors with
Integrated CMOS Circuitry,
Walter...*

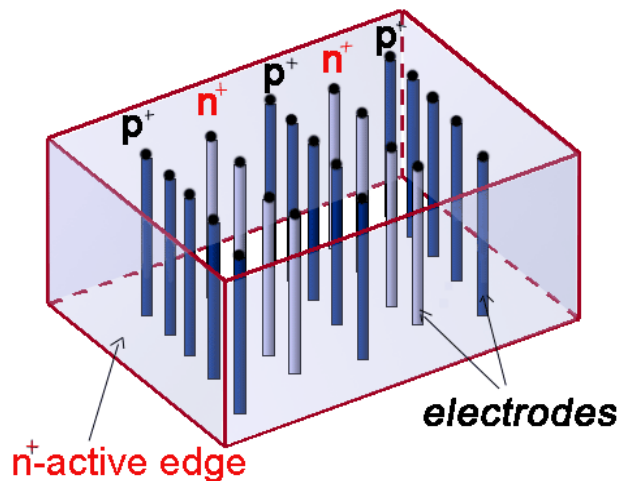


*Finally almost 15 years later...
NSS Conference in Hawaii... 2007*



3D Silicon sensors

NIMA 395 (1997) 328



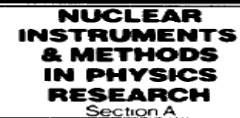
Centre for Integrated Systems



Stanford Nanofabrication Facility



Nuclear Instruments and Methods in Physics Research A 395 (1997) 328–343



3D – A proposed new architecture for solid-state radiation detectors¹

S.I. Parker^{a,*}, C.J. Kenney^a, J. Segal^b

^a University of Hawaii, Honolulu, USA

^b Integrated Circuits Laboratory, Stanford University, Stanford, USA

Acknowledgements Finally, we would like to thank Cinzia Davia for many interesting conversations on gallium arsenide detector developments and problems, one of which triggered the idea for this development.

*Grilled chicken sandwich
And discussions....*

Le
Bateau Jore
COFFEEHOUSE BAR RESTAURANT



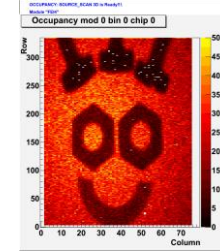
*...Normally on
napkins..*

15 years later...



A larger community these days...

FBK 12 Not
irradiated
Am. Source
By A. Micelli



3D SILICON SENSORS



CINZIA DA VIÀ, THE UNIVERSITY OF MANCHESTER, UK
FOR THE 3DATLAS COLLABORATION

Thanks to:

All 2011 Test beam
crews . In particular:
J. Weingarten
M. Georg, I. Gregor
the 'EUDET'
Telescope crew and
Nobu Unno.
And T. Fritsch-IZM

B. Stugu, H. Sandaker, K. Helle, (Bergen University), **M. Backhaus**, M. Barbero, **J. Janssen**, **F. Hüging**, M. Karagounis, V. Kostyukhin, H. Krüger, **D-L Pohl**, J-W Tsung, N. Wermes (Bonn University), M. Capua; S. Fazio, A. Mastroberardino; **R. Mendicino**, G. Susinno (Calabria University), **C. Gallrapp**, B. Di Girolamo; D. Dobos, **A. La Rosa**, H. Pernegger, S. Roe (CERN), T. Slavicek, S. Pospisil (Czech Technical University), K. Jakobs, M. Köhler, U. Parzefall (Freiburg University), **G. Darbo**, G. Gariano, **C. Gemme**, **A. Rovani**, **E. Ruscino** (University and INFN of Genova), C. Butter, R. Bates, V. O Shea (Glasgow University), **S. Parker** (The University of Hawaii), M. Cavalli-Sforza, **S. Grinstein**, **I. Korokolov**, **K. Shota Tsiskaridze** C. Padilla (IFAE Barcelona), K. Einsweiler, M. Garcia-Sciveres (Lawrence Berkeley National Laboratory), **M. Borri**, **C. Da Vià**, J. Freestone, **C. Lai**, **C. Nellist**, J. Pater, R. Thompson, S.J. Watts (The University of Manchester), M. Hoferkamp, S. Seidel (The University of New Mexico), E. Bolle, H. Gjersdal, K-N Sjoebaek, S. Stapnes, **O. Rohne**, (Oslo University) **D. Su**, C. Young, P. Hansson, **P. Grenier**, **J. Hasi**, **C. Kenney**, M. Kocian, P. Jackson, D. Silverstein (SLAC), H. Davetak, **B. DeWilde**, D. Tsybychev (Stony Brook University). **G-F Dalla Betta**, **M. Povoli** (University and INFN of Trento), M. Cobal, M-P Giordani, L. Selmi, A. Cristofoli, D. Esseni, **A. Micelli**, P. Palestri (University of Udine)

Processing Facilities: **C. Fleta**, M. Lozano **G. Pellegrini**, (CNM Barcelona, Spain); (**M. Boscardin**, A. Bagolini, **G. Giacomini**, F. Mattedi, C. Piemonte, S. Ronchin, **E. Vianello**, **N. Zorzi** (FBK-Trento, Italy) , **T-E. Hansen**, T. Hansen, **A. Kok**, N. Lietaer (SINTEF Norway), J. Hasi, C. Kenney (Stanford). J. Kalliopuska, A. Oja (VTT , Finland)*

18 institutions and 5 processing facilities

'TRENTO' 3D and planar Workshop (Manchester 2010)



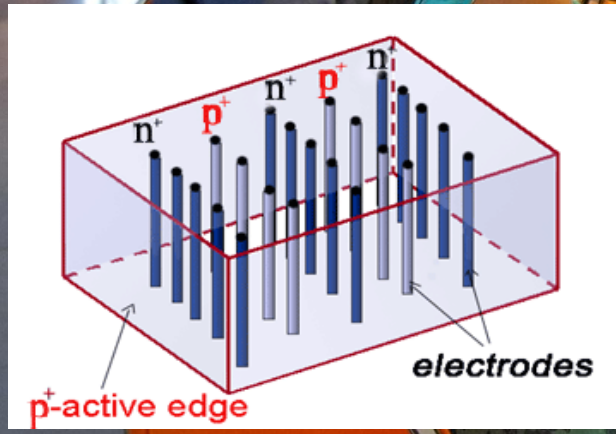
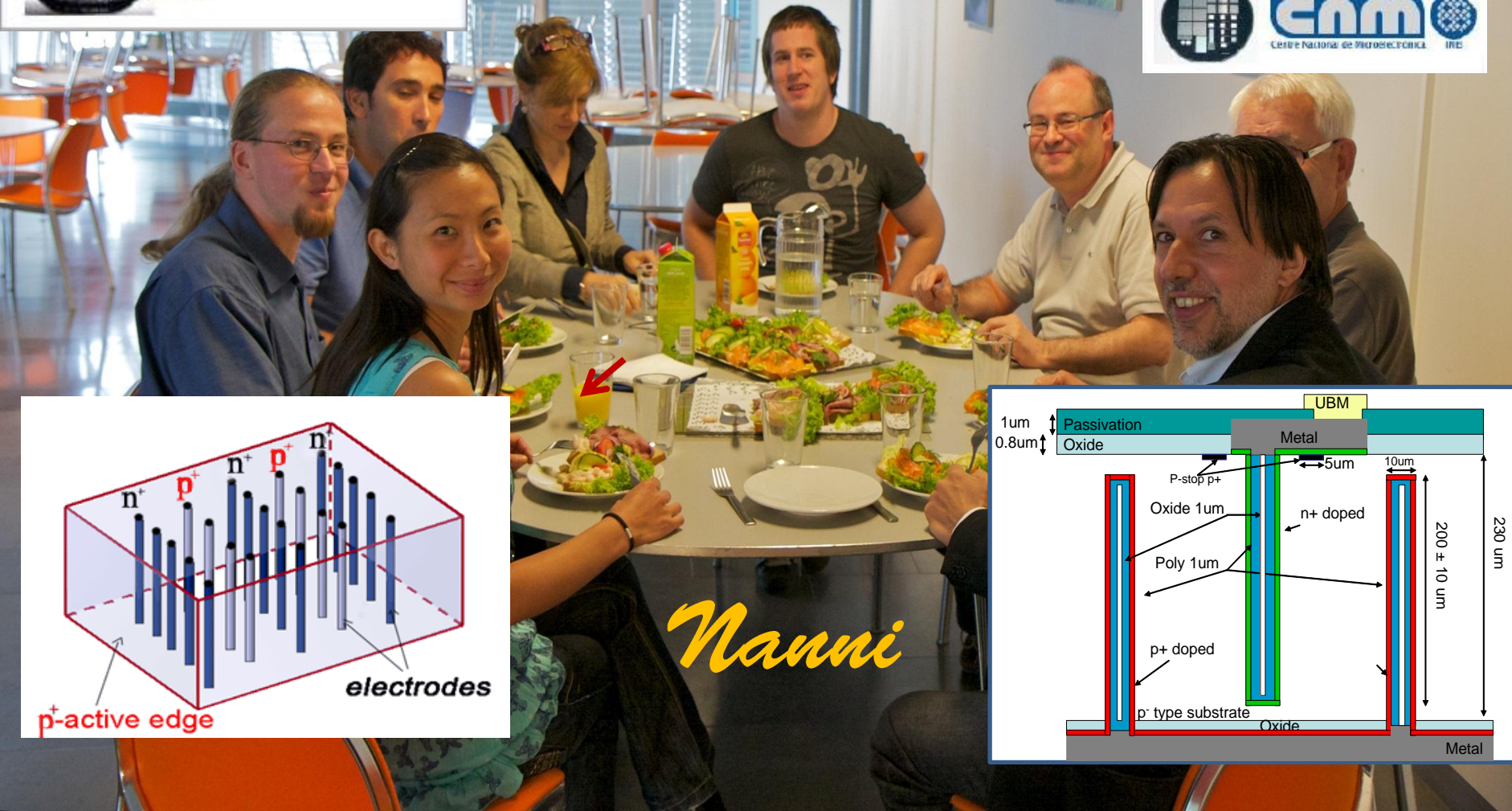
And more 3D flavours...

3D CONSORTIUM

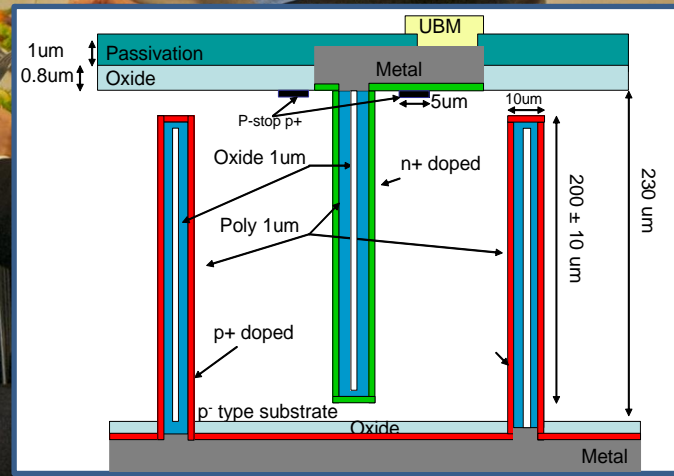


3D ATLAS R&D Collaboration

Processing Meeting at SINTEF

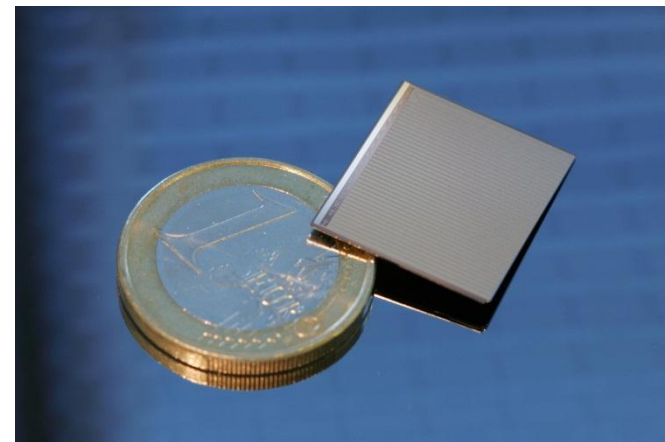
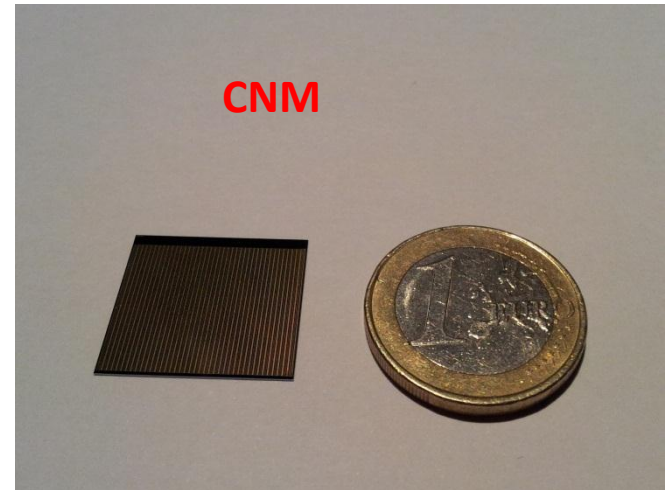
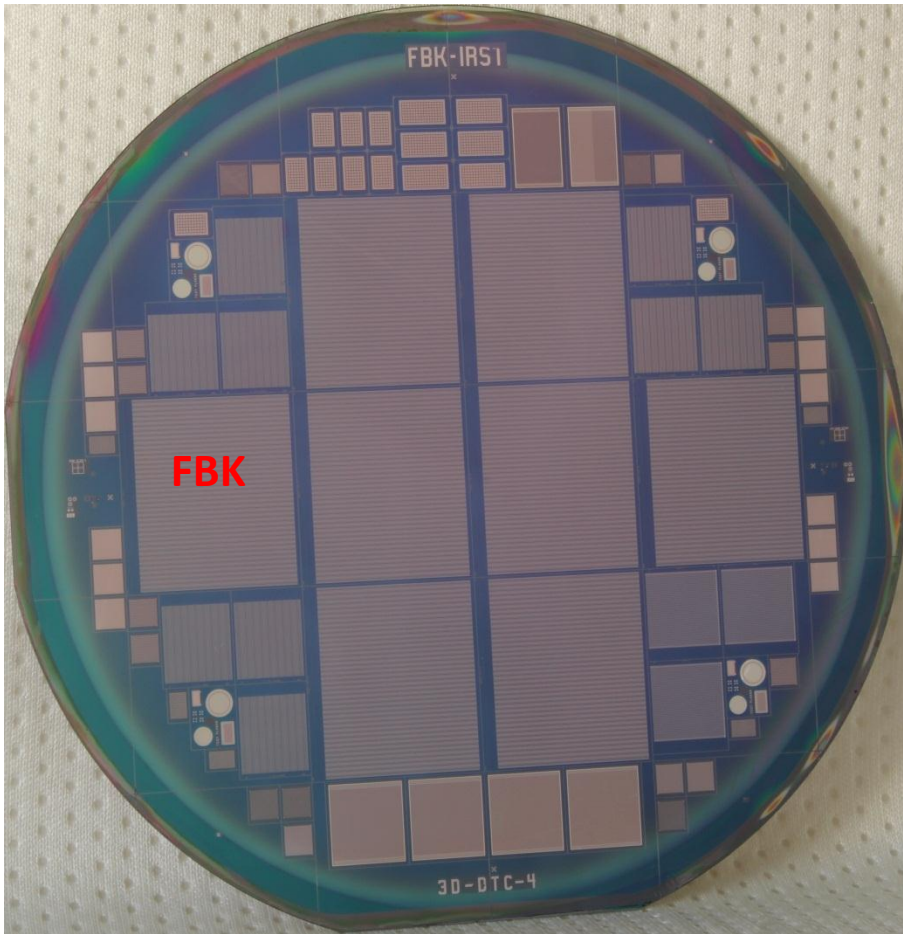


Nanni



2011 'annus mirabilis'

7E-74.. ~4 square cm!!! >300 perfect sensors!



SINTEF/STANFORD

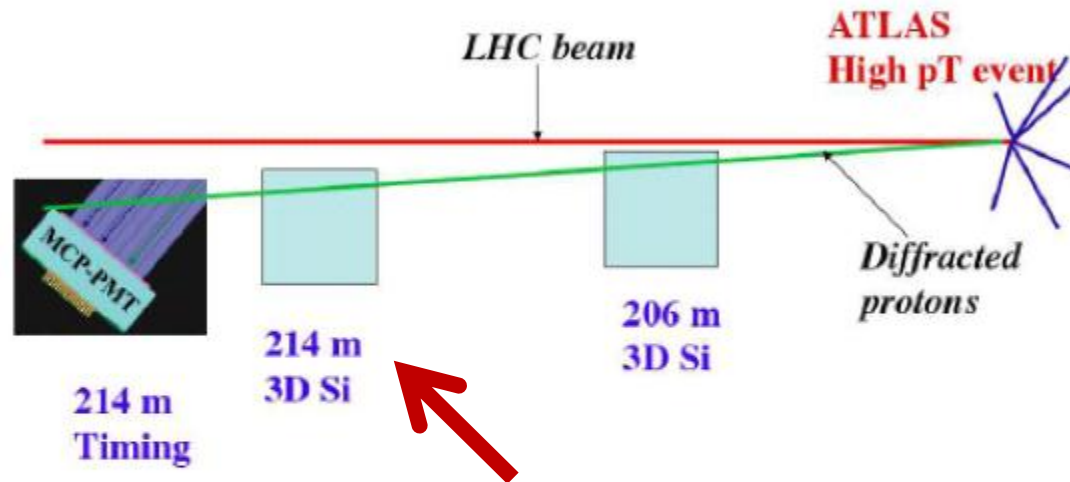
*IBL Sensors Review July 2011...
Waiting for the referees 'verdict'*



AFP Approved by LHCC!!!



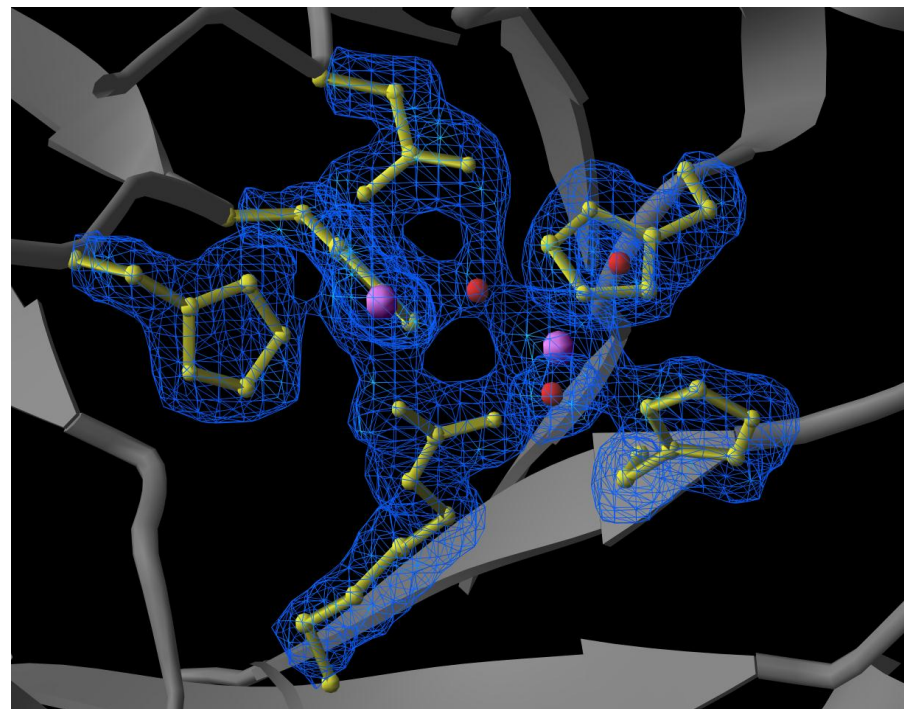
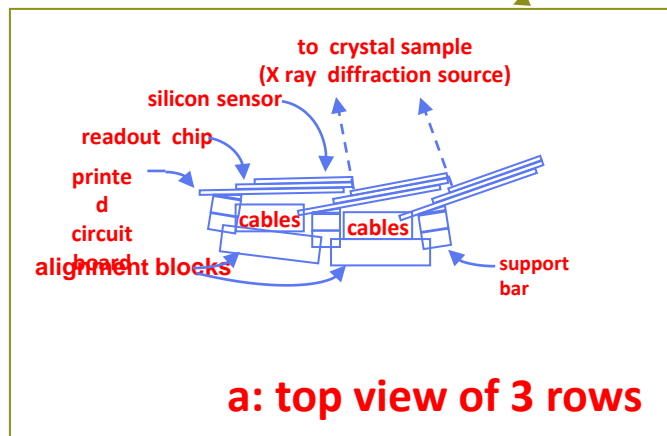
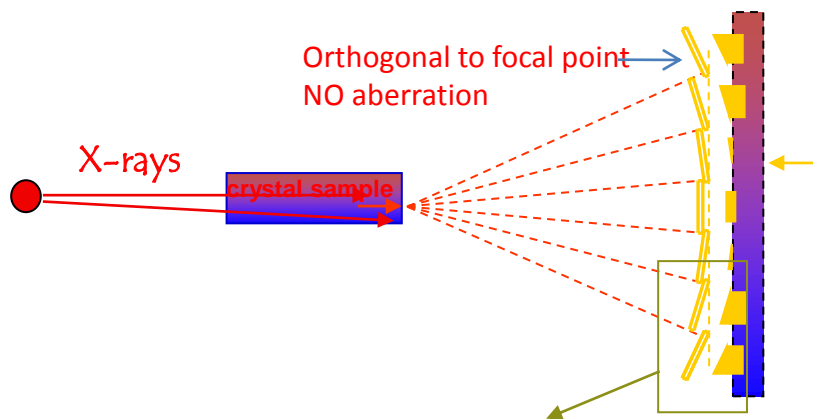
The AFP detector



- Tag and measure protons at ± 210 m
- Trigger: Rely on ATLAS high p_T L1 trigger
- AFP detectors: Radiation hard "edgeless" 3D Silicon detectors, 10 ps timing detectors
- Allows running in high pile up conditions by association with correct primary vertex: Access to rare processes

3DX: An X-Ray Pixel Array Detector With Active Edges

Sherwood I. Parker, Christopher J. Kenney, Dario Gnani, Albert C. Thompson, Emanuele Mandelli, Gerrit Meddeler, Jasmine Hasi, John Morse, and Edwin M. Westbrook



*And more to come..
Happy Birthday!!!*

