



FLNP

Precision investigation of modern crystalline materials by neutron diffraction method

By :

Mostafa R. Abukhadra

Asmaa Mohamed

2017

Frank Laboratory of Neutron Physics (FLNP)

Supervisors:

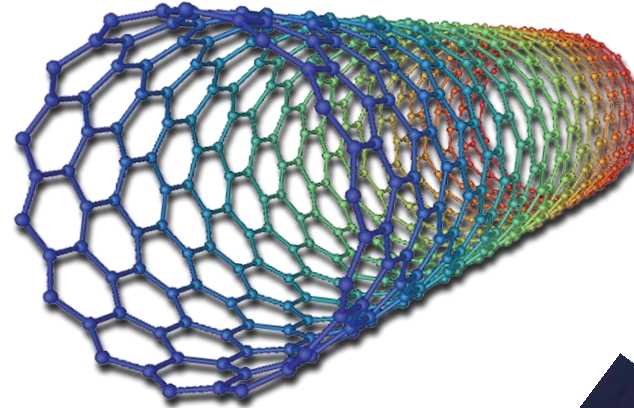
- PhD. **Ivan Bobrikov**, *researcher, Frank Laboratory of Neutron Physics, Condensed Matter Department*
- PhD. **Sergei Sumnikov**, *researcher, Frank Laboratory of Neutron Physics, Condensed Matter Department*



Agenda

- 1. Introduction**
- 2. Why Neutron Diffraction**
- 3. Neutron Diffraction & X-ray Diffraction**
- 4. Idea of Neutron Diffraction**
- 5. Neutron Diffraction in JINR**
- 6. Full Prof analysis**
- 7. Conclusion**
- 8. Recommendation**

1. Introduction





2. Why Neutron Diffraction

Problems we faced during our work:

Environ Chem Lett
DOI 10.1007/s10311-017-0658-7

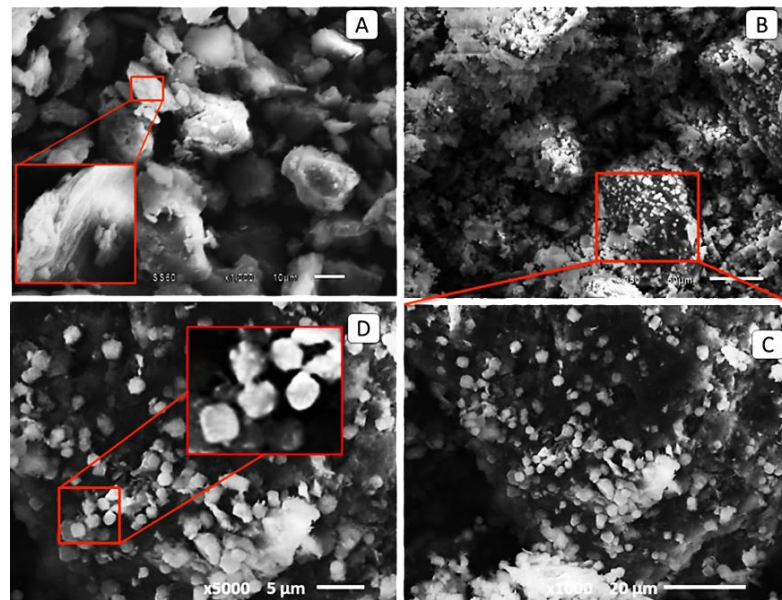
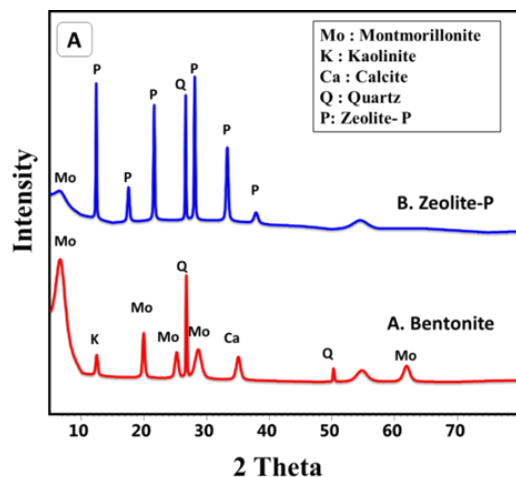


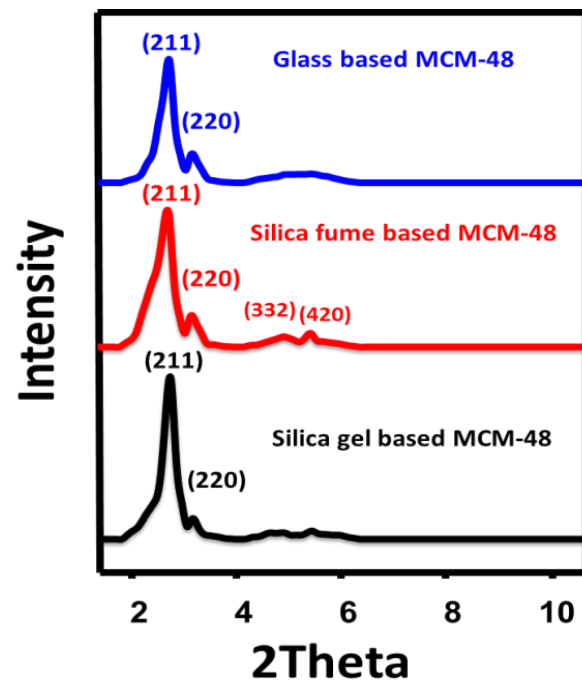
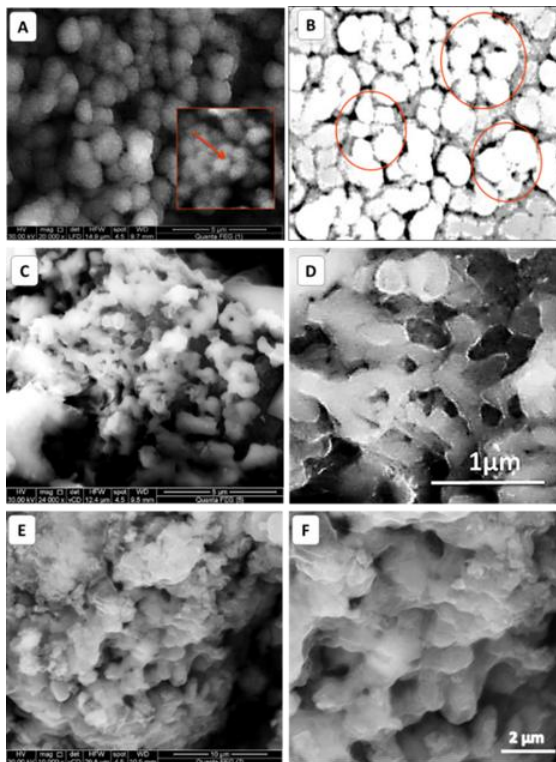
ORIGINAL PAPER

Novel bentonite/zeolite-NaP composite efficiently removes methylene blue and Congo red dyes

Mohamed Shaban¹ · Mostafa R. Abukhadra^{1,2} · M. G. Shahien² · Suzan S. Ibrahim³

Received: 14 April 2017 / Accepted: 26 July 2017
© Springer International Publishing AG 2017





Journal of Environmental Management 204 (2017) 189–199



Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman



Research article

Photocatalytic removal of Congo red dye using MCM-48/Ni₂O₃ composite synthesized based on silica gel extracted from rice husk ash; fabrication and application

Mohamed Shaban^a, Mostafa R. Abukhadra^{a, b, *}, Ahmed Hamd^{a, c}, Ragab R. Amin^c, Ahmed Abdel Khalek^d

^a Nanophotonics and Applications Lab, Physics Department, Faculty of Science, Beni-Suef University, Beni-Suef 62514, Egypt

^b Geology Department, Faculty of Science, Beni-Suef University, Beni-Suef, Egypt

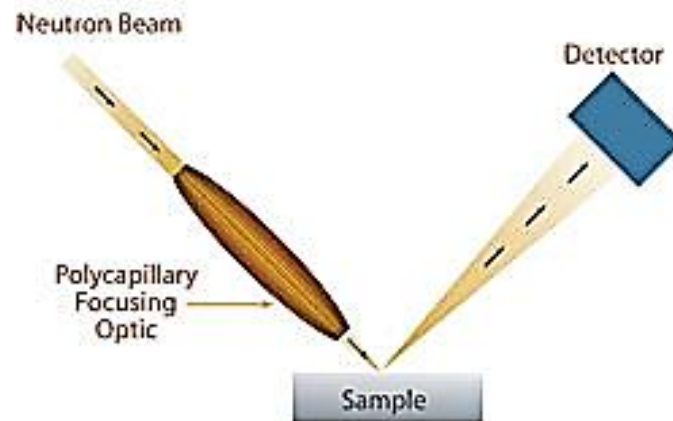
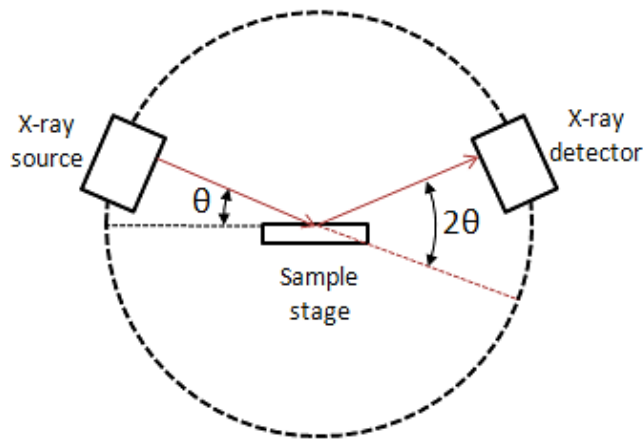
^c Basic Science Department, Faculty of Engineering, Nahda University Beni-Suef (NUB), Beni Suef, Egypt

^d Chemistry Department, Faculty of Science, Beni-Suef University, Beni-Suef, Egypt

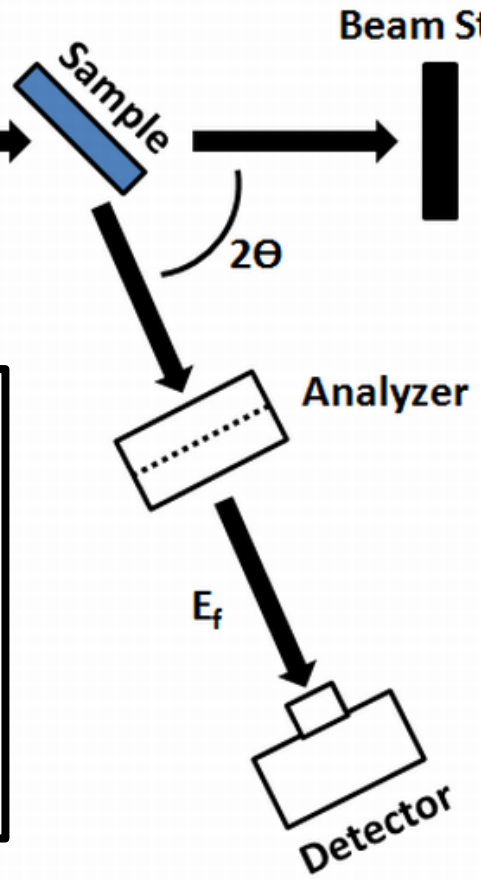
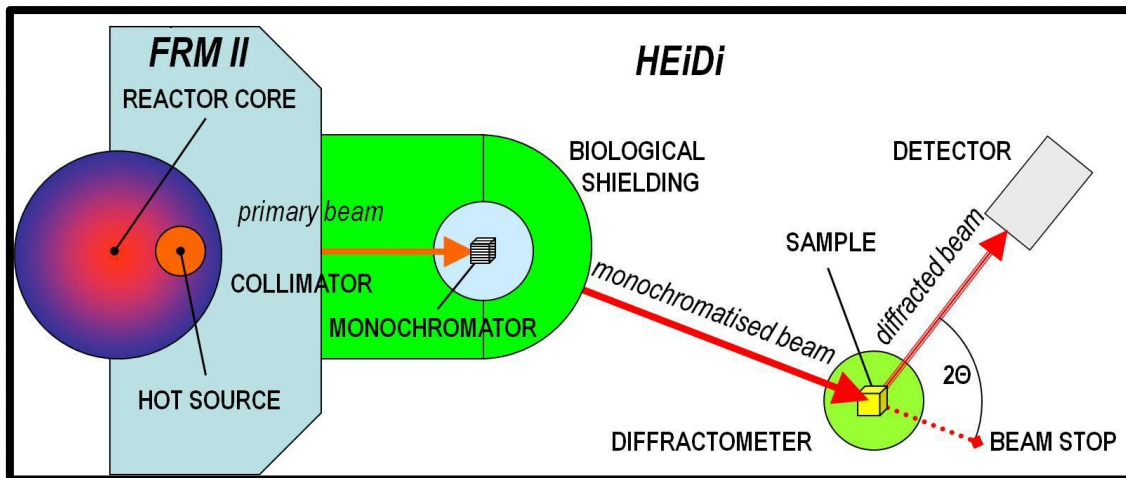
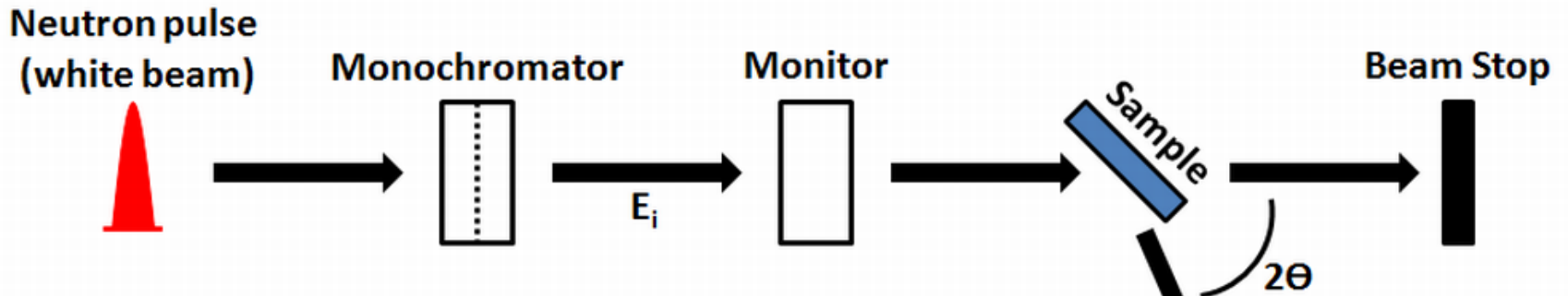


3. XRD Vs neutron Diffraction

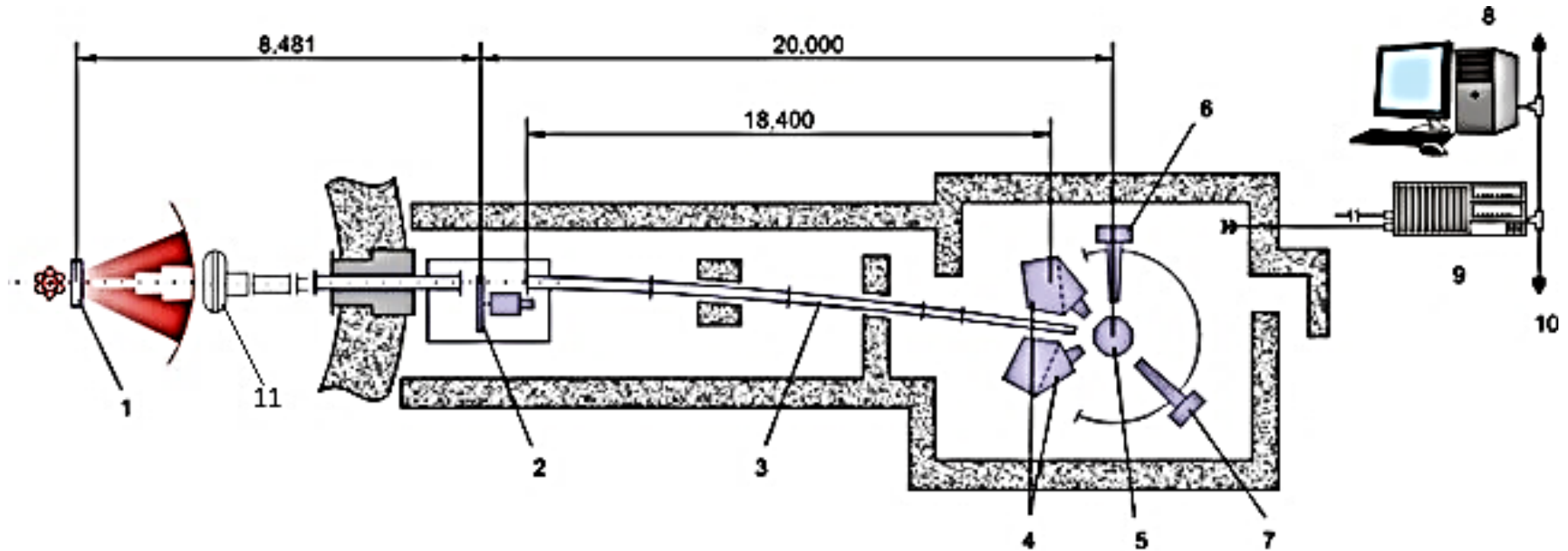
- It can be determine atomic and magnetic structures
- Low interaction with matters
- High penetration within the sample
- Give deep information about the interior of the sample and can mapping the internal stress
- Give valuable data about the lattice displacement
- Give information about static or dynamic disorder

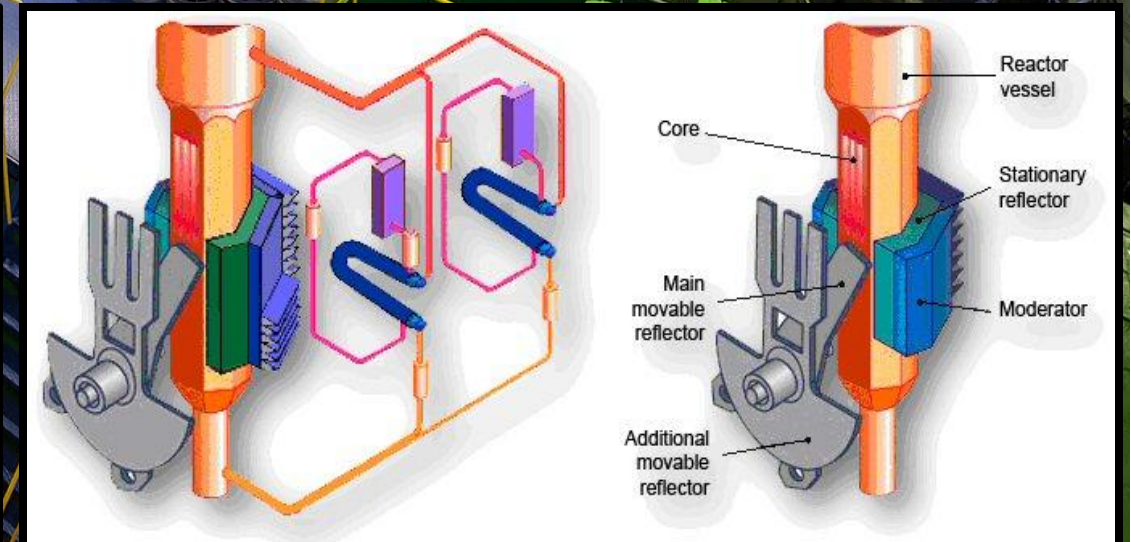
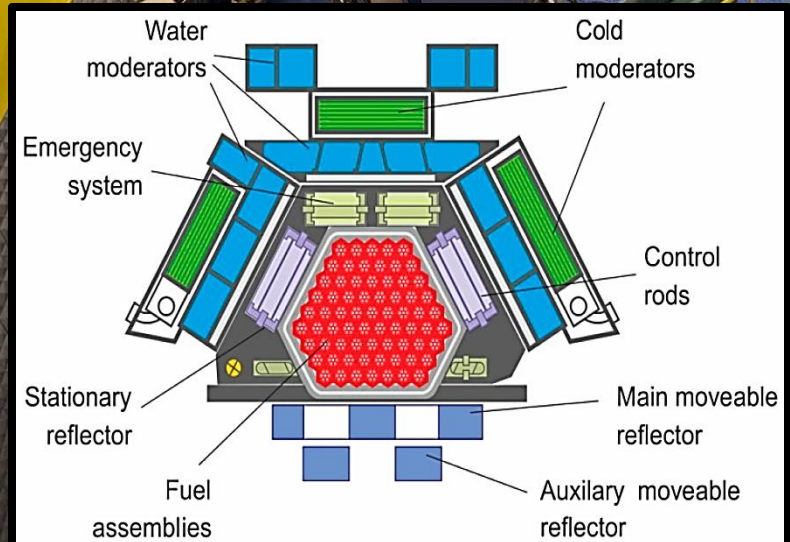
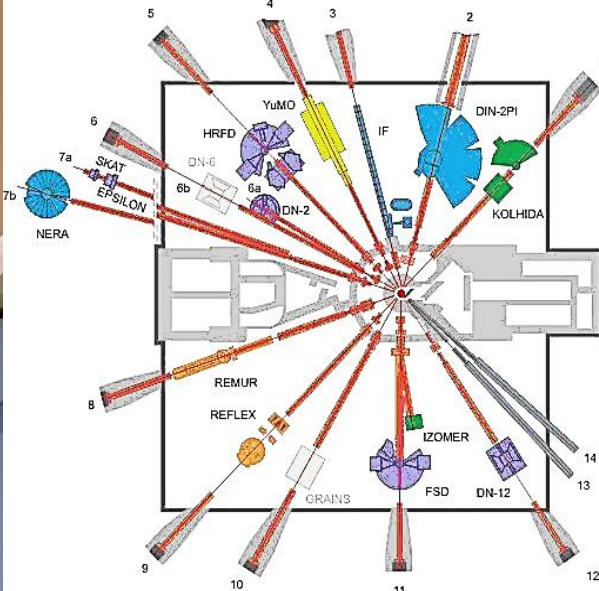


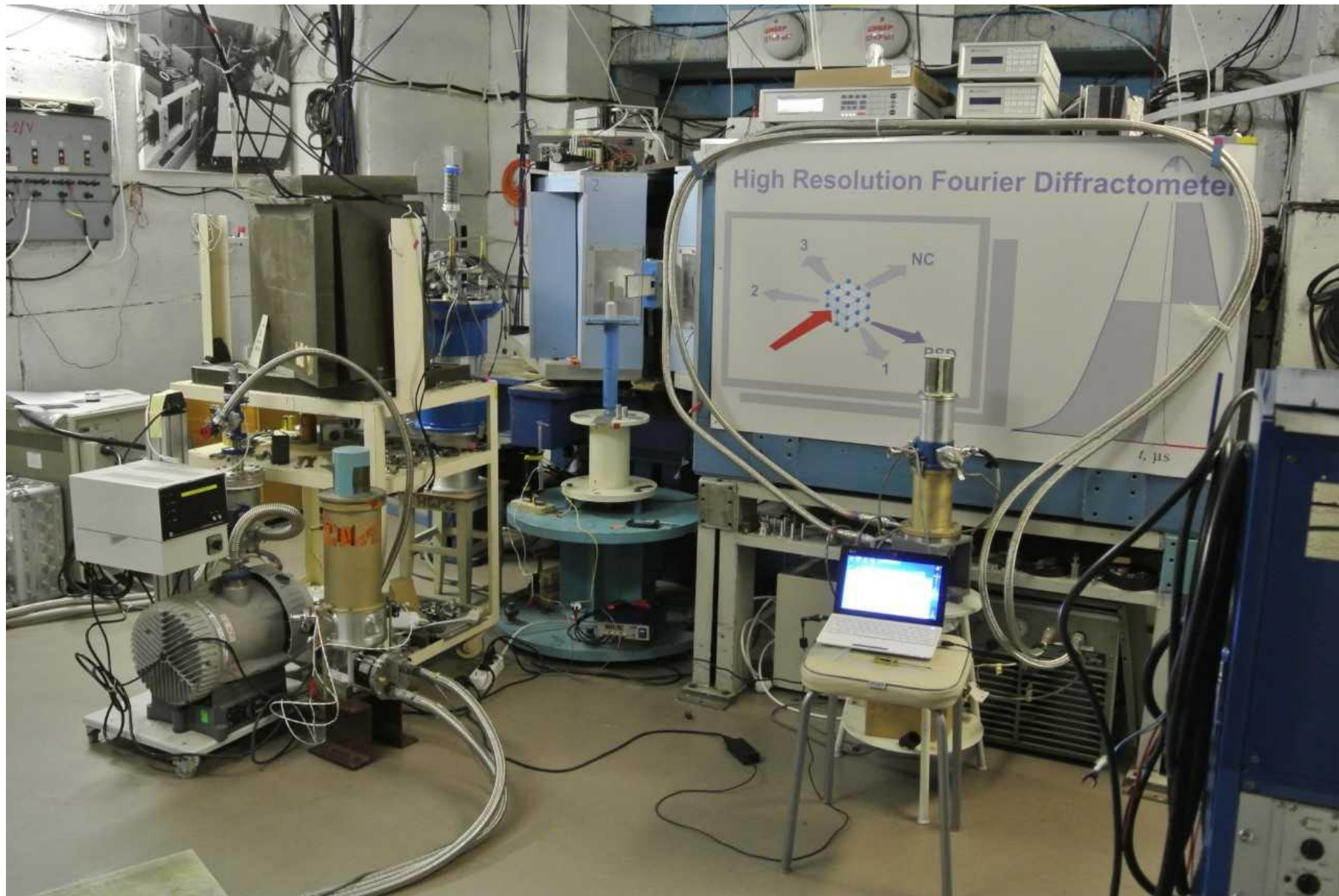
4. Idea of Neutron Diffraction



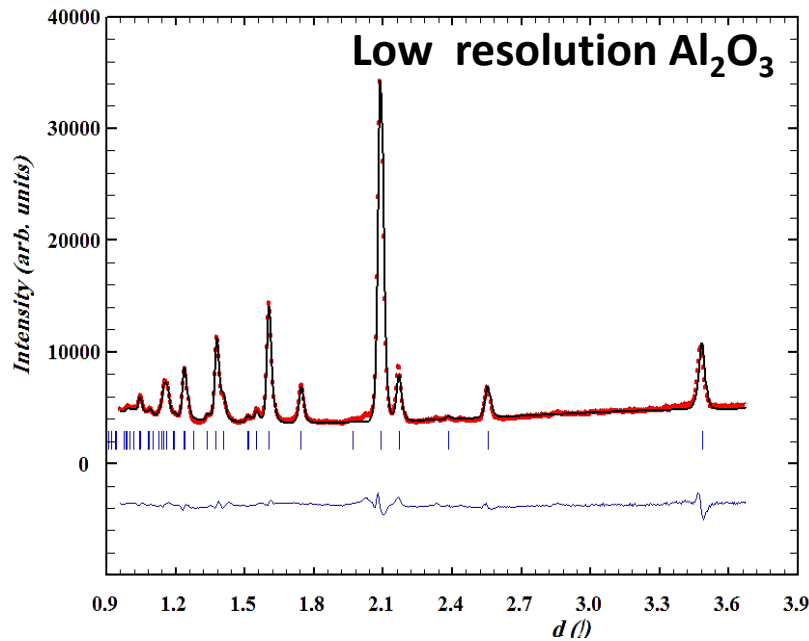
5. Neutron Diffraction in JINR





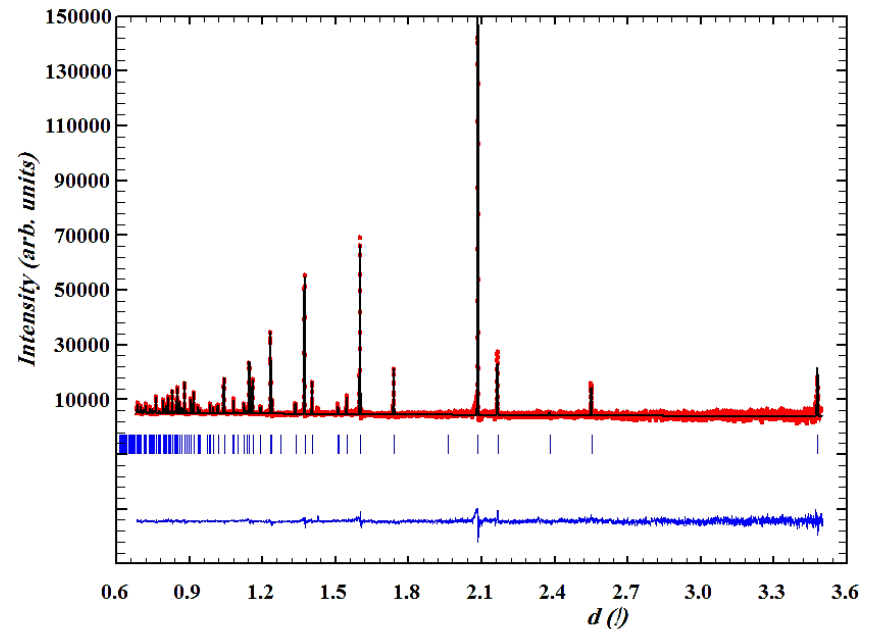


6. Full prof analysis



Standard sample – Al_2O_3

High resolution Al_2O_3

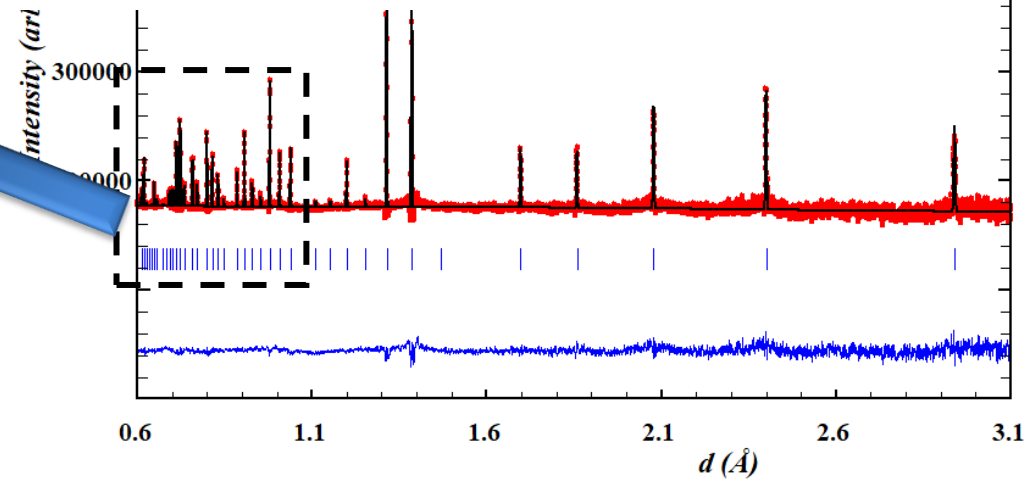
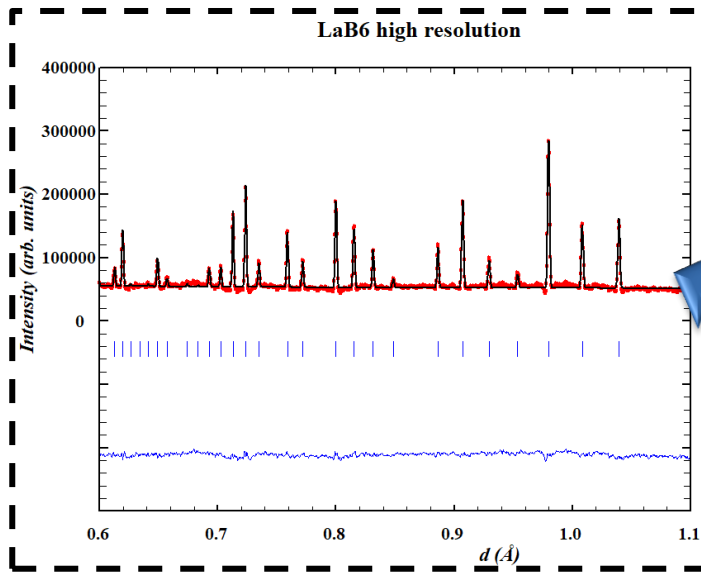
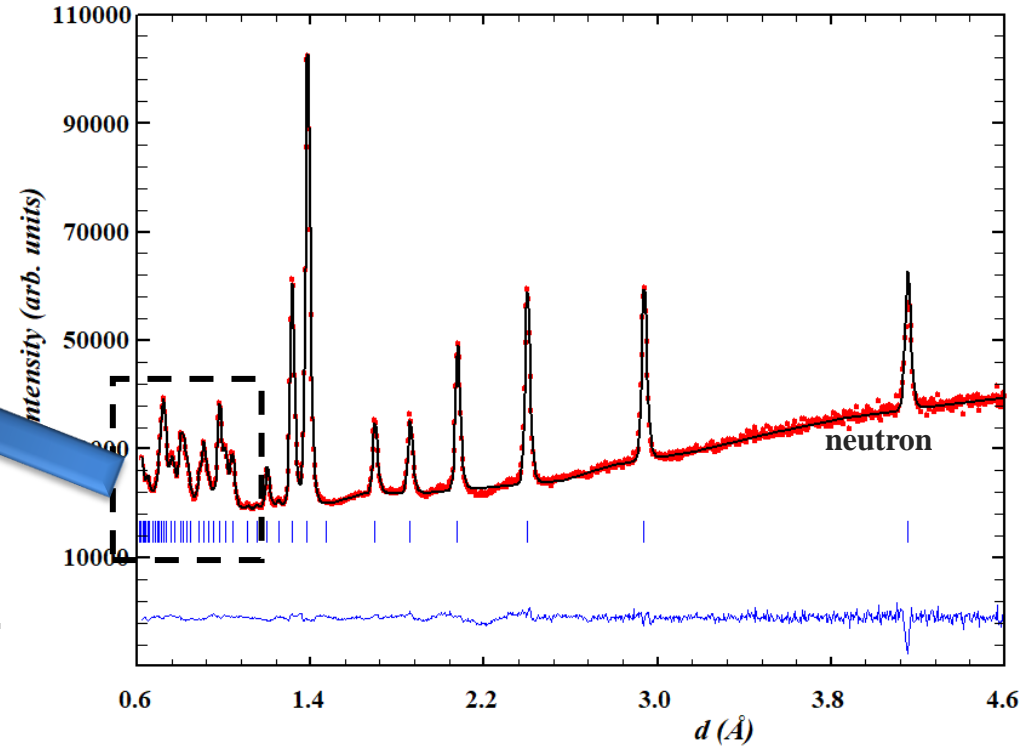
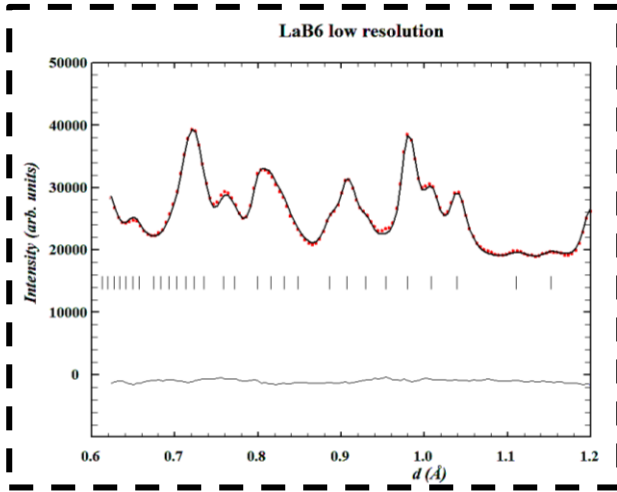


	Al_2O_3 low res.	Al_2O_3 high res.
Space group	R -3 c	
Zero	48±8	/
Dtt1	14585±4	10364.58±0.03
Sig0	9480±459	11±1
Sig 1	/	29.3±0.7

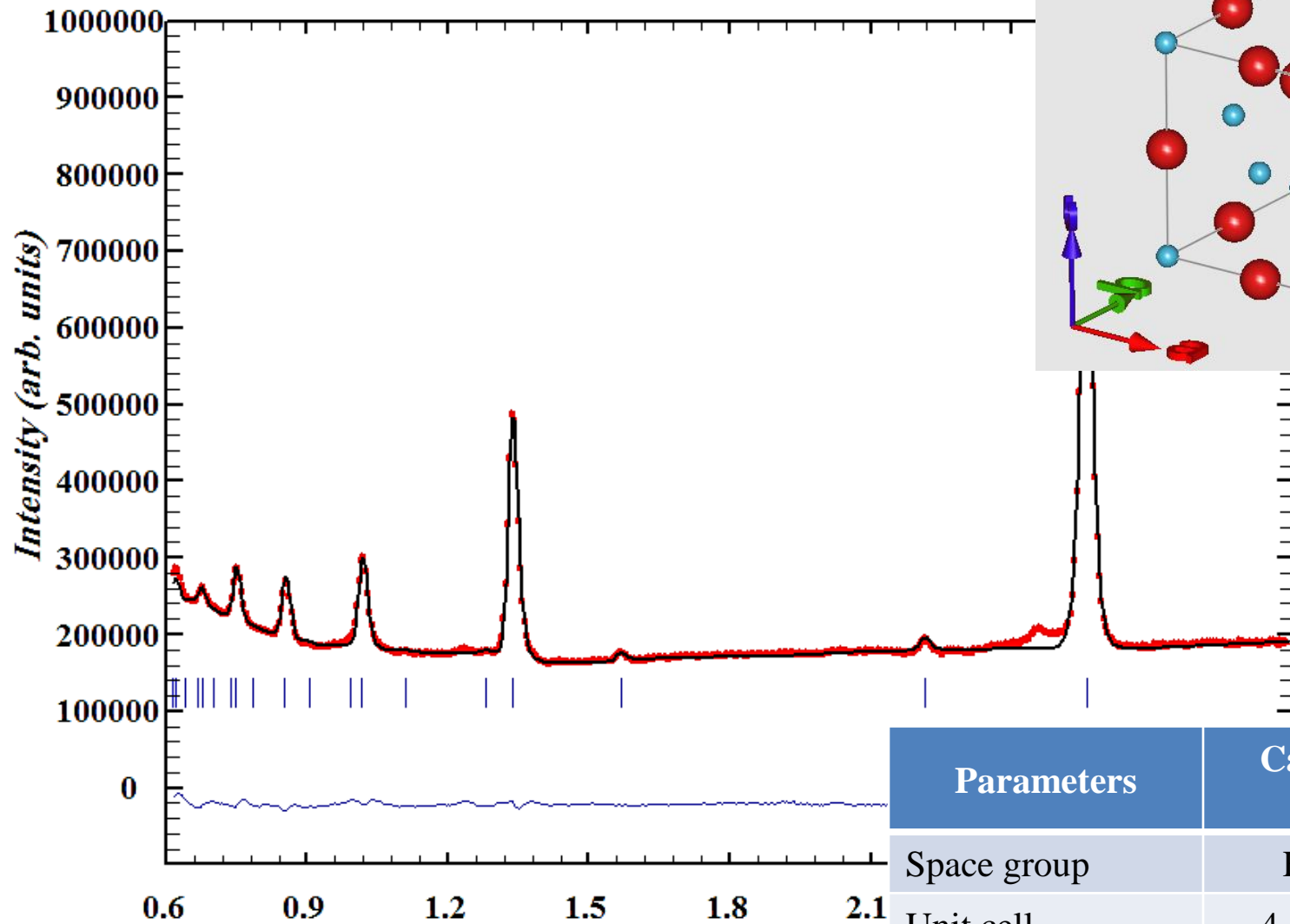
neutron

Standard sample – LaB₆

LaB₆ low resolution

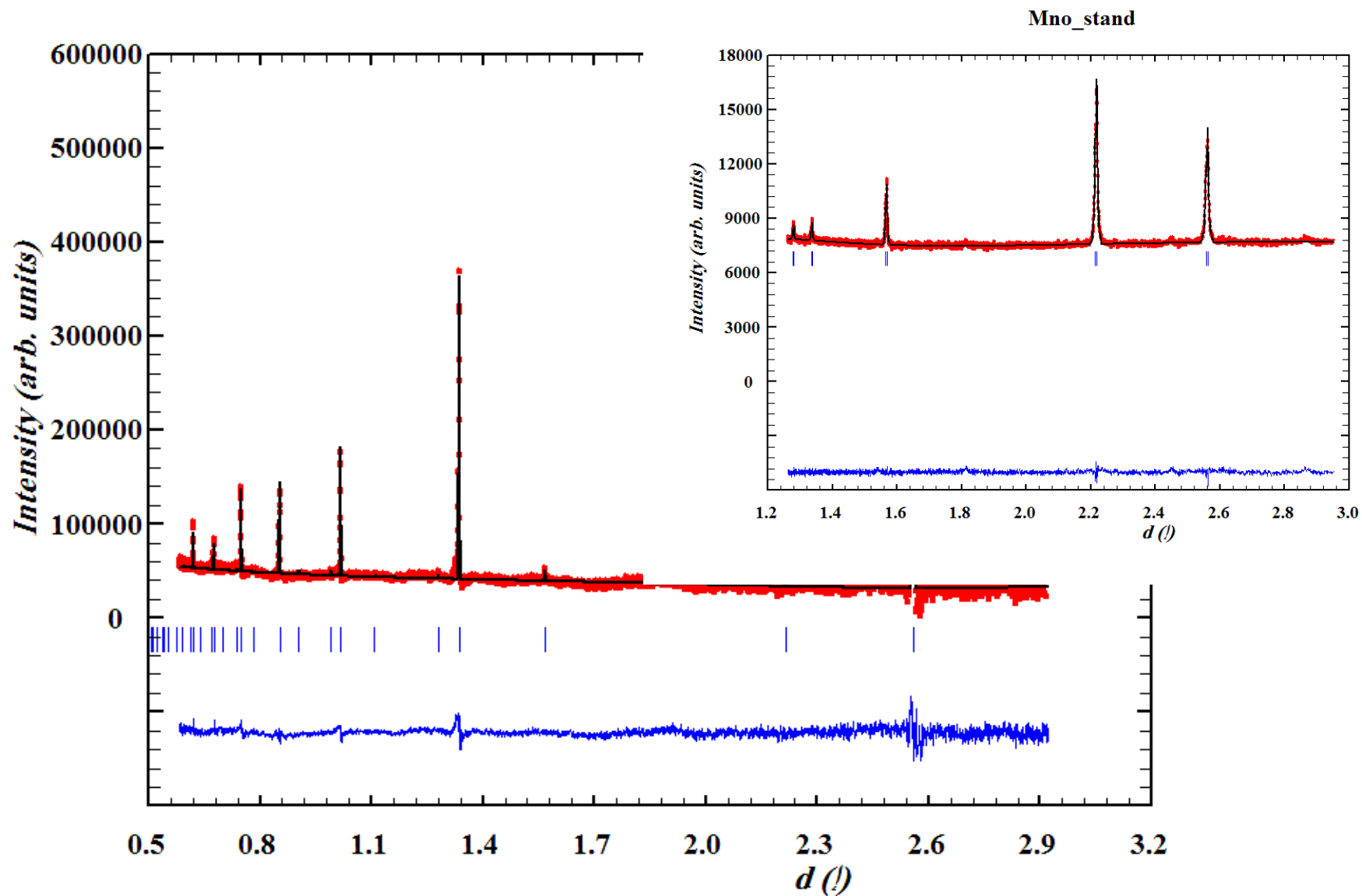


Low resolution MnO

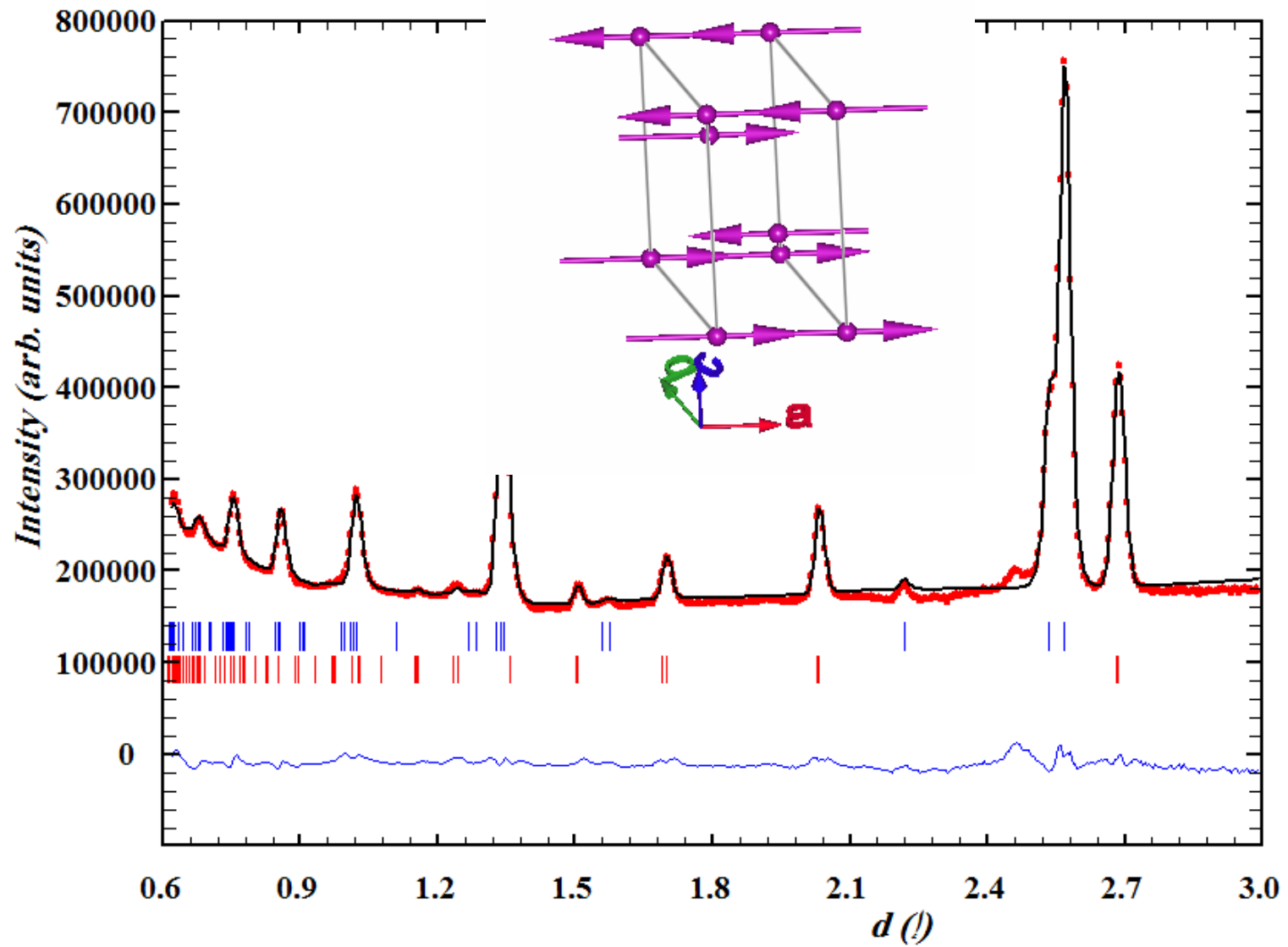


Parameters	Calculated value
Space group	F m 3 m
Unit cell parameters, a (Å)	4.432570 ± 0.0005

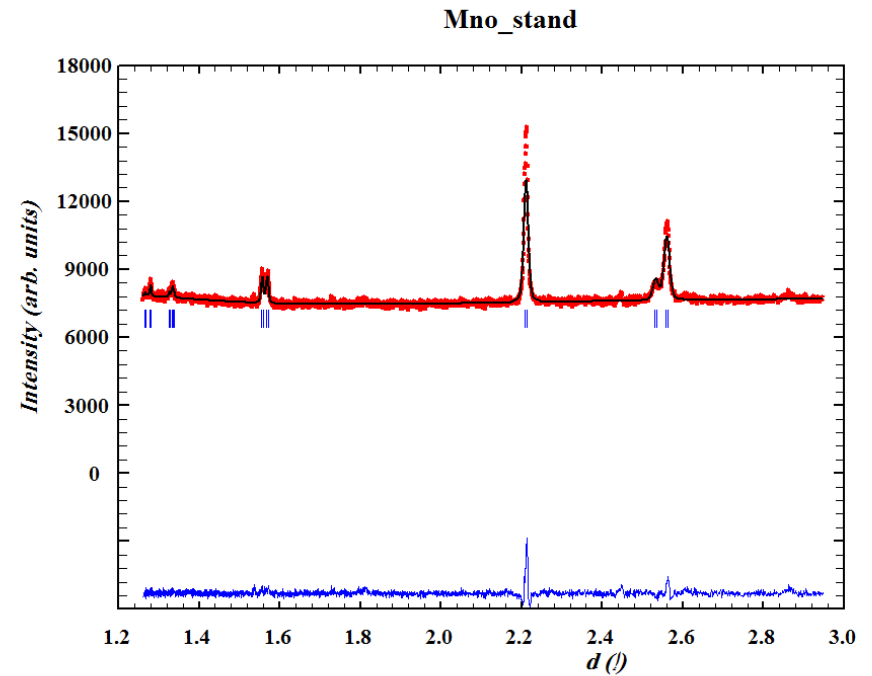
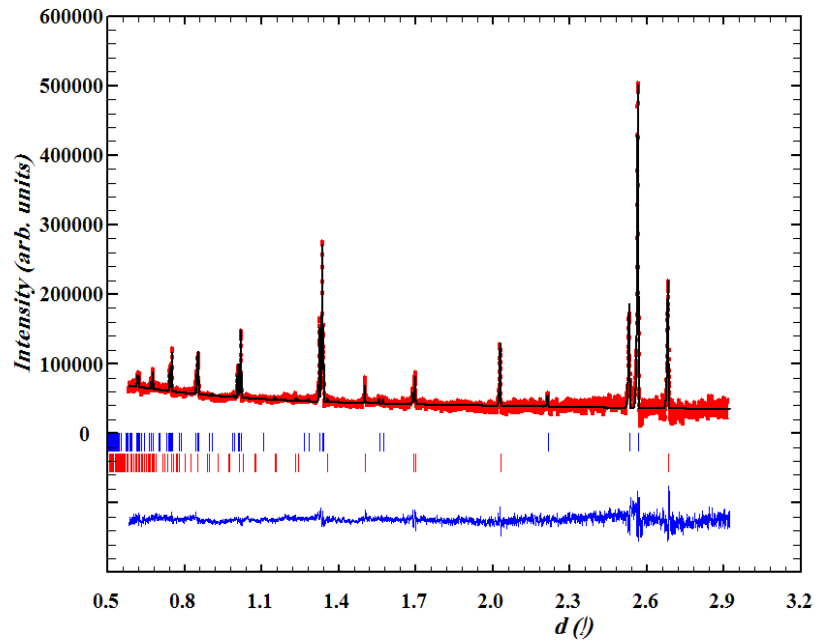
High resolution MnO at T = 290 K



Low resolution MnO at T = 15k



High resolution MnO at T =15k

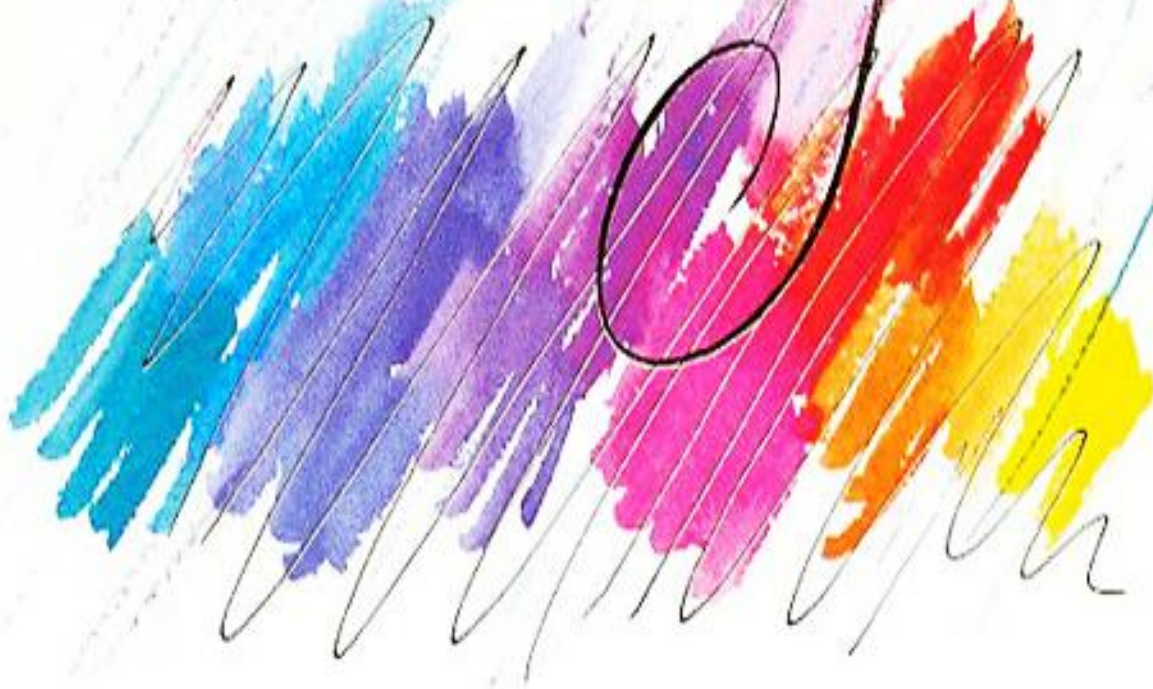


	MNO low res. 15k	MNO (XRD) 15k	MNO high res. 15k
Space group	R -3 m		
Unit cell parameters, a (Å)	3.14885 ± 0.0001	3.142355 ± 0.00008	3.148688 ± 0.00011
Unit cell parameters, c (Å)	7.608667 ± 0.002	7.604208 ± 0.00026	7.596878 ± 0.00018
Magnetic moment	3.90 ± 0.06	NO	4.408 ± 0.05

Conclusion

**Neutron diffraction
method are efficient
technique in
investigation of atomic
and magnetic structure
of advanced materials**

Thank You!





Questions