

# Curriculum vitae

Dr. rer. nat. Naveen Kumar

CHOGONDAHALLI MUNIRAJU

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## WORK EXPERIENCE

NOV 2017 - CURRENT

Technische Universität Wien, Austria  
**Senior Research Associate**

Working on transport, x-ray and neutron scattering studies of high- $T_C$  superconductors under pulsed magnetic field and uniaxial pressures. As part of the project, involved in the development of He-gas uniaxial pressure cell to be used in transport, x-ray and neutron scattering measurements. Also setting-up an IR spectrometer for the optical conductivity measurements after gaining an expert training in the measurement and analysis of IR spectroscopy data on correlated electron systems.

AUG 2016 - JUL 2017

LNCMI - Toulouse, France  
**Post Doc**

This position involved neutron diffraction studies of heavy fermion materials under magnetic fields (up to 40 T) at the world leading high-pulsed-magnetic-field lab in Toulouse and large scale facilities: ESRF and ILL in Grenoble, France.

JUL 2012 - JUL 2016

Oak Ridge National Laboratory, USA  
**Instrument scientist**

This position involved assisting users of the time of flight neutron powder diffractometer, POWGEN, with the measurement and data analysis. In addition, was principal investigator in studying magnetoelectric phase diagram of multiferroic  $Mn_{1-x}Cu_xWO_4$ . Also collaborated on the neutron diffraction studies of phase-change material GeTe and strongly correlated systems LaMnSbO and CeMnSbO. Also collaborated on analysis of neutron powder diffraction data of several oxide materials:  $Y_2NiMnO_6$ ,  $TbFe_{0.5}Mn_{0.5}O_3$  and  $HoCrO_3$

FEB 2008 - JUN 2012

Forschungszentrum Jülich GmbH, Germany  
**Doctoral researcher**

**Title: Crystal and spin structure and their relation to physical properties in some geometrical and spin spiral multiferroics**

The topics elucidated in the doctoral thesis are: Nuclear hyperfine interactions, crystal field interactions, magnetic ordering, spin fluctuations and magnetoelastic effects in  $HoCrO_3$  by magnetization, heat capacity, x-ray, elastic and inelastic neutron diffraction measurements. Magnetic ordering and magnetoelastic effect in hexagonal  $DyMnO_3$  by x-ray and neutron diffraction measurements. Magnetic ordering in  $Mn_{0.9}Co_{0.1}WO_4$  and  $Mn_{0.9}Cu_{0.1}WO_4$  by neutron diffraction measurements.

APR 2006 - AUG 2007

Indian Institute of Science, India  
**Project Assistant**

Worked on synthesis and single crystal growth of multiferroic rare earth manganites by floating-zone technique.

## EDUCATION

2008 - 2012 **Doctor of Philosophy (Physics)**

MAGNA CUM LAUDE  
JCNS Juelich, Germany  
RWTH Aachen, Germany

2003-2005 **Master of Science (Physics)**

FIRST CLASS  
Christ college, Bangalore University, India

2000 - 2003 **Bachelor of Science**

FIRST CLASS  
Sri Kongadiyappa college  
Bangalore University, India

## SKILLS

BEGINNER	Programming in Python and C++
INTERMEDIATE	Matlab, Bilbao Crystallographic Server
EXPERT	IR spectroscopy, X-ray & Neutron scattering, Magnetometry, Specific heat & Transport measurements under extreme conditions, Crystal growth, Solid-state synthesis.

## PUBLICATIONS

*Selected publications as one of the principal contributor (Full list attached separately)*

1. *Inorg. Chem.*, 59 (2020) 15144
2. *Phys. Rev. B*, 28 (2019) 184411
3. *J. Phys.: Condens. Matter*, 30 (2018) 435803
4. *J. Phys.: Condens. Matter*, 29 (2017) 345801
5. *J. Phys.: Condens. Matter*, 28 (2016) 476001
6. *Phys. Rev. B*, 93 (2016) 214428
7. *Phys. Rev. B*, 91 (2015) 235149
8. *Phys. Rev. B*, 91 (2015) 054110
9. *Phys. Rev. B*, 83 (2011) 104424
10. *J. Phys.: Condens. Matter*, 20 (2008) 275234

## RESEARCH WEB PAGES

Google scholar (CMN Kumar, citations = 900,  $h$ -index = 15,  $i_{10}$ -index = 23)

Web Of Science ResearcherID:G-9769-2018

ORCID:0000-0002-8867-8291

## PROFESSIONAL ACTIVITIES

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### **Memberships:**

Materials Research Society  
American Physical Society  
Neutron Scattering Society of America  
The European Physical Society

### **Active Reviewer for:**

APS Journals (PRB,  
PRL), IEEE  
Physica Status Solidi  
J. of Bio- and Tribo-Corr.

## REFERENCE CONTACT

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### **Prof. Neven Barišić**

Department of Physics, Faculty of Science  
University of Zagreb  
Bijenička cesta 32, 10000 Zagreb

Institut für Festkörperphysik, TU Wien  
Wiedner Hauptstr. 8-10/138  
1040 Wien, Austria

## List of publications

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1. Successive spin reorientations and rare earth ordering in  $\text{Nd}_{0.5}\text{Dy}_{0.5}\text{FeO}_3$ : Experimental and ab initio investigations.  
Ankita Singh, Sarita Rajput, Padmanabhan Balasubramanian, M. Anas, Francoise Damay, C. M. N. Kumar, Gaku Eguchi, A. Jain, S. M. Yusuf, T. Maitra, and V. K. Malik, *Phys. Rev. B*, **102**, 144432, 2020
2. Magnetocaloric Effect in a Frustrated Gd-Garnet with No Long-Range Magnetic Order.  
Naveen Kumar Chogondahalli Muniraju, Raju Baral, Yefan Tian, Rui Li, Narayan Poudel, Krzysztof Gofryk, Neven Barišić, Boris Kiefer, Joseph H. Ross, and Harikrishnan S. Nair, *Inorg. Chem.*, **59**, 15144, 2020
3. Structure and ion transport of lithium-rich  $\text{Li}_{1+x}\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$  with  $0.3 < x < 0.5$ : A combined computational and experimental study.  
David Case, Adam J. McSloy, Ryan Sharpe, Stephen R. Yeandel, Thomas Bartlett, James Cookson, Enkhtsetseg Dashjav, Frank Tietz, C. M. Naveen Kumar, and Pooja Goddard, *Solid State Ionics*, **346**, 115192, 2020
4. Noncollinear magnetic structure and anisotropic magnetoelastic coupling in cobalt pyrovanadate  $\text{Co}_2\text{V}_2\text{O}_7$ .  
W. H. Ji, L. Yin, W. M. Zhu, C. M. N. Kumar, C. Li, H.-F. Li, W. T. Jin, S. Nandi, X. Sun, Y. Su, Th. Brückel, Y. Lee, B. N. Harmon, L. Ke, Z. W. Ouyang, and Y. Xiao, *Phys. Rev. B*, **100**, 134420, 2019
5. Contrasting the magnetism in  $\text{La}_{2-x}\text{Sr}_x\text{FeCoO}_6$  ( $x = 0, 1, 2$ ) double perovskites: The role of electronic and cationic disorder.  
G. R. Haripriya, C. M. N. Kumar, R. Pradheesh, L. M. Martinez, C. L. Saiz, S. R. Singamaneni, T. Chatterji, V. Sankaranarayanan, K. Sethupathi, B. Kiefer, and H. S. Nair, *Phys. Rev. B*, **99**, 184414, 2019
6. Magnetic structure and field-dependent magnetic phase diagram of  $\text{Ni}_2$  In-type  $\text{PrCuSi}$ .  
H. S. Nair, C. M. N. Kumar, D. T. Adroja, C. Ritter, W. A. Kockelmann, P. P. Deen, A. Bhattacharya and A. M. Strydom, *J. Phys.: Condens. Matter*, **30**, 43, 2018
7. Quasielastic and low-energy inelastic neutron scattering study of  $\text{HoCrO}_3$  by high resolution time-of-flight neutron spectroscopy.  
T Chatterji, F Demmel, N Jalarvo, A Podlesnyak, C. M. N. Kumar, Y Xiao and T Brückel, *J. Phys.: Condens. Matter*, **29**, 47, 2017
8. Pr-magnetism in the quasi-skutterudite compound  $\text{PrFe}_2\text{Al}_8$ .  
Harikrishnan S. Nair, Michael O. Ogunbunmi, C. M. N. Kumar, D. T. Adroja, P. Manuel, D. Fortes, J. Taylor and André M. Strydom, *J. Phys.: Condens. Matter*, **29**, 34, 2017
9. Low temperature magnetic properties of frustrated pyrochlore ferromagnet  $\text{Ho}_2\text{Ir}_2\text{O}_7$ .  
Dinesh Kumar, S. Y. Chen, M. K. Lee, C. M. N. Kumar, R. Aldus and L. J. Chang, *J. Phys.: Conf. Ser.*, **828**, 012008, 2017
10. Investigation of crystal structure and ionic transport in a scandium-based NASICON material by neutron powder diffraction.  
M. Guin, E. Dashjav, C. M. N. Kumar, F. Tietz, O. Guillon, *Solid State Sci.*, **67**, 30-36, 2017
11. A single crystal X-ray and powder neutron diffraction study on NASICON-type  $\text{Li}_{1+x}\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$  ( $0 < x < 0.5$ ) LATP crystals: implications on electrical conductivity.  
G. J. Redhammer, D. Rettenwander, S. Pristat, E. Dashjav, C. M. N. Kumar, Dan Topa and Frank Tietz, *Solid State Sci.*, **60**, 99, 2016
12. Hyperfine and crystal field interactions in multiferroic  $\text{HoCrO}_3$ .  
C. M. N. Kumar, Y. Xiao, H. S. Nair, J Voigt, B. Schmitz, T. Chatterji, N. Jalarvo and Th. Brückel, *J. Phys.: Condens. Matter*, **28**, 476001, 2016
13. Spin Wave and Electromagnon Dispersions in Multiferroic  $\text{MnWO}_4$  as Observed by Neutron Spectroscopy: Isotropic Heisenberg Exchange versus Anisotropic Dzyaloshinskii-Moriya Interaction.



- Y. Xiao, C. M. N. Kumar, S. Nandi, Y. Su, W. T. Jin, Z. Fu, E. Faulhaber, A. Schneidewind, and Th. Brückel, Phys. Rev. B, **93**, 214428, 2016
14. Ammonothermal synthesis, crystal structure and properties of the ytterbium(II) and ytterbium(III) amides and two new ytterbium guanidates,  $\text{YbC}(\text{NH})_3$  and  $\text{Yb}(\text{CN}_3\text{H}_4)_3$ . Arno Görne, Janine George, Jan van Leusen, Gerald Dück, Philipp Jacobs, Naveen Kumar Chogondahalli Muniraju and Richard Dronskowski, Inorg. Chem. **55**(12), 6161, 2016
  15. Neutron powder diffraction and theory-aided structure refinement of rubidium and cesium ureate. Kjersti B. Sterri, Volker L. Deringer, Andreas Houben, Philipp Jacobs, Chogondahalli M.N. Kumar and Richard Dronskowski, Z. Naturforschung B, **71**, 431, 2016
  16. Structure and magnetic properties of  $\text{LnMnSbO}$  ( $\text{Ln} = \text{La}$  and  $\text{Ce}$ ). Qiang Zhang, C. M. N. Kumar, Wei Tian, Kevin W. Dennis, Alan I. Goldman and David Vaknin, Phys. Rev. B, **93**, 094413, 2016
  17. Magnetic structures and magnetic phase transitions in the Mn-doped orthoferrite  $\text{TbFeO}_3$  studied by neutron powder diffraction. Hari Krishnan S. Nair, Tapan Chatterji, C. M. N. Kumar, Thomas Hansen, Hariharan Nhalil, Suja Elizabeth and André M. Strydom, J. Appl. Phys., **119**, 053901, 2016
  18. Ferromagnetism and the effect of free charge carriers on electric polarization in the double perovskite  $\text{Y}_2\text{NiMnO}_6$ . Hariharan Nhalil, Hari Krishnan S. Nair, C. M. N. Kumar, André M. Strydom, and Suja Elizabeth, Phys. Rev. B, **92**, 214426, 2015
  19. Crystal structure, incommensurate magnetic order and ferroelectricity in  $\text{Mn}_{1-x}\text{Cu}_x\text{WO}_4$ . C. M. N. Kumar, Y. Xiao, P. Lunkenheimer, A. Loidl and M. Ohl, Phys. Rev. B, **91**, 235149, 2015
  20. Anomalous temperature-induced volume contraction in  $\text{GeTe}$ . T. Chatterji, C. M. N. Kumar and U. D. Wdowik, Phys. Rev. B, **91**, 054110, 2015
  21. Spin-lattice coupling and frustrated magnetism in Fe-doped hexagonal  $\text{LuMnO}_3$ . Hari Krishnan S. Nair, Z. Fu, C. M. N. Kumar, V. Y. Pomjakushin, Y. Xiao, T. Chatterji and A. M. Strydom, EPL, **110**, 37007, 2015
  22. Direct observation of low energy nuclear spin excitations in  $\text{HoCrO}_3$  by high resolution neutron spectroscopy. T. Chatterji, N. Jalarvo, C. M. N. Kumar, Y. Xiao and Th. Brückel, J. Phys.: Condens. Matter, **25**, 286003, 2013
  23. Anomalous in-plane magnetoresistance in a  $\text{EuFe}_2\text{As}_2$  single crystal: Evidence of strong spin-charge-lattice coupling. Y. Xiao, Y. Su, S. Nandi, S. Price, B. Schmitz, C. M. N. Kumar, R. Mittal, T. Chatterji, N. Kumar, S. K. Dhar, A. Thamizhavel and Th. Brückel, Phys. Rev. B, **85**, 094504, 2012
  24. Observation of spin-glass state in weakly ferromagnetic  $\text{Sr}_2\text{FeCoO}_6$ . Pradheesh R., Hari Krishnan S. Nair, C. M. N. Kumar, J. Lamsal, R. Nirmala, P. N. Santosh, W. B. Yelon, S. K. Malik, V. Sankaranarayanan and K. Sethupathi, J. Appl. Phys., **111**, 053905, 2012
  25. Strong coupling of Sm and Fe magnetism in  $\text{SmFeAsO}$  as revealed by magnetic x-ray scattering. S. Nandi, Y. Su, Y. Xiao, S. Price, X. F. Wang, X. H. Chen, J. Herrero-Martín, C. Mazzoli, H. C. Walker, L. Paolasini, S. Francoual, D. K. Shukla, J. Stremper, T. Chatterji, C. M. N. Kumar, R. Mittal, H. M. Rønnow, C. Rüegg, D. F. McMorrow and Th. Brückel, Phys. Rev. B, **84**, 054419, 2011
  26. Physical properties, crystal and magnetic structure of layered  $\text{Fe}_{1.11}\text{Te}_{1-x}\text{Se}_x$  superconductors. Y. Xiao, Y. Su, C. M. N. Kumar, C. Ritter, R. Mittal, S. Price, J. Perßon and Th. Brückel, Eur. Phys. J. B, **82**, 113, 2011

27. Ferromagnetic transition and specific heat of  $\text{Pr}_{0.6}\text{Sr}_{0.4}\text{MnO}_3$ .  
S. Rößler, Harikrishnan S. Nair, U. K. Rößler, **C. M. N. Kumar**, Suja Elizabeth and S. Wirth, *Phys. Rev. B*, **84**, 184422, 2011
28. Effect of Y-substitution on the structural, magnetic and thermal properties of hexagonal  $\text{DyMnO}_3$  single crystals.  
Harikrishnan S. Nair, **C. M. N. Kumar**, Bhat H. L., Suja Elizabeth and Th. Brückel, *Phys. Rev. B*, **83**, 104424, 2011
29. Neutron diffraction investigation of the crystal and magnetic structures in  $\text{KCrF}_3$  perovskite.  
Y. Xiao, Y. Su, H.-F. Li, **C. M. N. Kumar**, R. Mittal, J. Persson, A. Senyshyn, K. Gross and Th. Brückel, *Phys. Rev. B*, **82**, 094437, 2010
30. Memory effect in  $\text{Dy}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$  single crystals.  
Harikrishnan S., S. Rößler, **C. M. N. Kumar**, Y. Xiao, Bhat H. L., U. K. Rößler, F. Steglich, S. Wirth and Suja Elizabeth, *J. Phys.: Condens. Mater.*, **22**, 346002, 2010
31. Field-induced spin reorientation and giant spin-lattice coupling in  $\text{EuFe}_2\text{As}_2$ .  
Y. Xiao, Y. Su, W. Schmidt, K. Schmalzl, **C. M. N. Kumar**, S. Price, T. Chatterji, R. Mittal, L. J. Chang, S. Nandi, N. Kumar, S. K. Dhar, A. Thamizhavel and Th. Brückel, *Phys. Rev. B*, **81**, 220406, 2010
32. Neutron diffraction study of phase transitions and thermal expansion of  $\text{SrFeAsF}$ .  
Y. Xiao, Y. Su, R. Mittal, T. Hansen, S. Price, **C. M. N. Kumar**, J. Persson, S. Matsuishi, Y. Inoue, H. Hosono and Th. Brückel, *Phys. Rev. B*, **81**, 094523, 2010
33. Magnetic structure of  $\text{EuFe}_2\text{As}_2$  determined by single-crystal neutron diffraction.  
Y. Xiao, Y. Su, R. Mittal, M. Meven, R. Mittal, **C. M. N. Kumar**, T. Chatterji, S. Price, J. Persson, N. Kumar, S. K. Dhar, A. Thamizhavel and Th. Brückel, *Phys. Rev. B*, **80**, 174424, 2009
34. Magnetic order in the  $\text{CaFe}_{1-x}\text{Co}_x\text{AsF}$  ( $x = 0.00, 0.06, 0.12$ ) superconducting compounds.  
Y. Xiao, Y. Su, R. Mittal, T. Chatterji, T. Hansen, **C. M. N. Kumar**, S. Matsuishi, H. Hosono and Th. Brückel, *Phys. Rev. B*, **79**, 060504(R), 2009
35. Phase transitions and rare earth magnetism in hexagonal and orthorhombic  $\text{DyMnO}_3$  single crystals.  
Harikrishnan S., S. Rößler, **Naveen Kumar C. M.**, Bhat H. L., U. K. Rößler, S. Wirth, F. Steglich and Suja Elizabeth, *J. Phys.: Condens. Mater.*, **21**, 096002, 2009
36. Phase transition and anomalous low temperature ferromagnetic phase in  $\text{Pr}_{0.6}\text{Sr}_{0.4}\text{MnO}_3$  single crystals.  
S. Rößler, Harikrishnan S., **Naveen Kumar C. M.**, Bhat H. L., Suja Elizabeth, U. K. Rößler, F. Steglich and S. Wirth, *J. Supercond. and Novel Mag.*, **22**, 205-208, 2009
37. Investigations on the spin-glass state in  $\text{Dy}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$  single crystals through structural, magnetic and thermal properties.  
Harikrishnan S., **Naveen Kumar C. M.**, Bhat H. L., Suja Elizabeth, S. Rößler, U. K. Rößler, K. Dörr and S. Wirth, *J. Phys.: Condens. Mater.*, **20**, 275234, 2008
38. EPR studies on multiferroic  $\text{DyMnO}_3$  and  $\text{Dy}_{0.50}\text{Sr}_{0.50}\text{MnO}_3$ .  
Harikrishnan S., **Naveen Kumar C. M.**, Rao S. S., Bhat H. L., Bhat S. V. and Suja Elizabeth, *J. Appl. Phys.*, **104**, 023902, 2008

## List of conferences and seminars

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1. 25 Jan 2019, Zagreb, Croatia.  
**Seminar:** Transport, optical, x-ray and neutron scattering measurements on strongly correlated electron systems.
2. GDR MEETIC, 28–31 March 2017, Latresne, France.  
**Oral presentation:** Neutron diffraction study of  $\text{CeRh}_2\text{Si}_2$  under pulsed magnetic field.
3. American Conference on Neutron Scattering (ACNS 2016), 10–14 July 2016, Long Beach, CA, USA.  
**Poster:** Magnetic order and multiferroicity  $\text{NdCrTiO}_5$ .
4. American Conference on Neutron Scattering (ACNS 2014), 1–5 June 2014, Knoxville, TN, USA.  
**Poster:** Incommensurate magnetic ordering in  $\text{HgCr}_2\text{S}_4$ .
5. PNI in-house workshop on 'Magnetism and Magnetic Materials, 11–12 June 2012, Freising, Germany.  
**Oral presentation:** Crystal and magnetic structures in some geometrical and spin spiral multiferroics.
6. Juelich Center for Neutron Scattering Workshop, 4–7 October 2010, Bernried, Germany.  
**Oral presentation:** Crystal and Magnetic Structure of  $\text{DyMnO}_3$ .
7. Polarized Neutrons and Synchrotron X-Rays for Magnetism Conference 2009, 2–5 August 2009, Bonn, Germany.  
**Poster:** Magnetic structure of Hexagonal  $\text{DyMnO}_3$ .
8. DPG Spring Meeting, 22–27 of March 2009, Dresden, Germany.  
**Oral presentation:** Coupling between Ho and Cr magnetic sub lattice in rare-earth orthochromite  $\text{HoCrO}_3$ .
9. German Neutron Scattering Conference 2008, 15–17 September 2008, Garching, Germany.  
**Poster:** Magnetic ordering in  $\text{HoCrO}_3$  compound

## List of invited talks

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1. From Solid State to Biophysics IX, 16–23 June 2018, Cavtat, Croatia.  
Magnetic structure of  $\text{CeRh}_2\text{Si}_2$  under pulsed magnetic field.
2. Hands-on workshop on Refinement of X-ray powder diffraction using FullProf suite, 22 July 2015, Christ College (Deemed to be University), Bangalore, India.  
Refinement of X-ray powder diffraction using FullProf suite.
3. Structure determination by X-ray and neutron powder diffraction: basics and beyond, 14 July 2015, Christ College (Deemed to be University), Bangalore, India.  
Refinement of X-ray powder diffraction using FullProf suite.