



Xavier Batlle 1987-1993

Ph.D. 1990

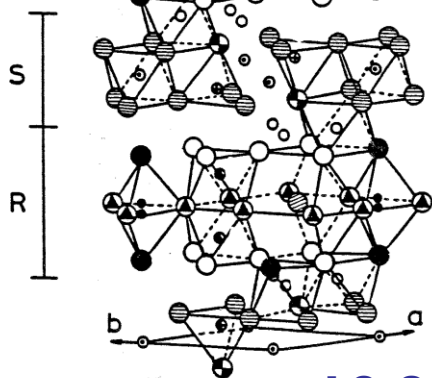
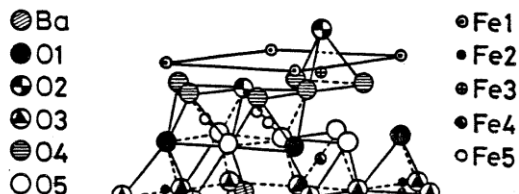
UNIVERSITAT DE BARCELONA

FACULTAT DE FISICA

ESTUDIS DE FERRITES HEXAGONALS DOPADES AMB Co^{2+}

I OXIDS DE Ni TIPUS La_2NiO_4

Memòria presentada per en Xavier
Batlle i Gelabert per obtenir el
grau de Doctor en Física.



J.C. Gómez Sal

$\text{BaFe}_{12}\text{O}_{19}$



Ph.D. 1983

THÈSE
présentée à

L'UNIVERSITÉ SCIENTIFIQUE ET MÉDICALE
ET L'INSTITUT NATIONAL POLYTECHNIQUE
DE GRENOBLE

pour obtenir le grade

DOCTEUR DE 3^e CYCLE

par

Xavier Obadors

SUJET

SYNTHÈSE
ET
ETUDE STRUCTURALE ET MAGNETIQUE
DE
QUELQUES FERRITES HEXAGONAUX

Nobel Prize 1987:
Bednorz and Müller

Cation distribution and intrinsic magnetic properties of Co-Ti-doped M-type barium ferrite

X. Batlle

Departament Física Fonamental, Universitat de Barcelona, Diagonal 647, 08028 Barcelona, Spain

X. Obradors

Institut de Ciència de Materials de Barcelona, C.S.I.C., Martí i Franquès s/n, 08028 Barcelona, Spain

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Institut Laue-Langevin, 156X, 38042 Grenoble Cedex, France

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Laboratoire de Cristallographie, C.N.R.S., 166X, 38042 Grenoble Cedex, France

M. V. Cabañas and M. Vallet

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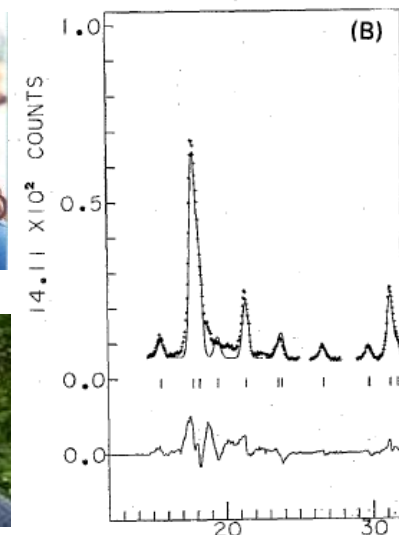
J. Appl. Phys. **70** (3), 1 August 1991



Marita Vallet



J. Rodríguez Carvajal



Spin glass transition in BaCo₆Ti₆O₁₉

X. Batlle and A. Labarta

Departamento Física Fundamental, Universitat Barcelona, Diagonal 647, Barcelona-08028, Spain

B. Martínez and X. Obradors

Instituto de Ciencia de Materiales de Barcelona, C. S. I. C., Campus U. Autónoma Barcelona, Bellaterra 08193, Spain

V. Cabañas and M. Vallet-Regí

Laboratorio Magnetismo Aplicado RENFE-U, Complutense de Madrid, Las Matas 028290, Madrid. Spain

J. Appl. Phys. **70** (10), 15 November 1991



Spain Scientific
Membership ILL 1987

Surface spin canting in $\text{BaFe}_{12}\text{O}_{19}$ fine particles

X. Batlle ^a, X. Obradors ^b, M. Medarde ^{c,b}, J. Rodríguez-Carvajal ^{c,b}, M. Perr
and M. Vallet-Regí ^e

^a *Departament de Física Fonamental, Universitat de Barcelona, Av. Diagonal 647, E-08028 Barcelona, Spain*

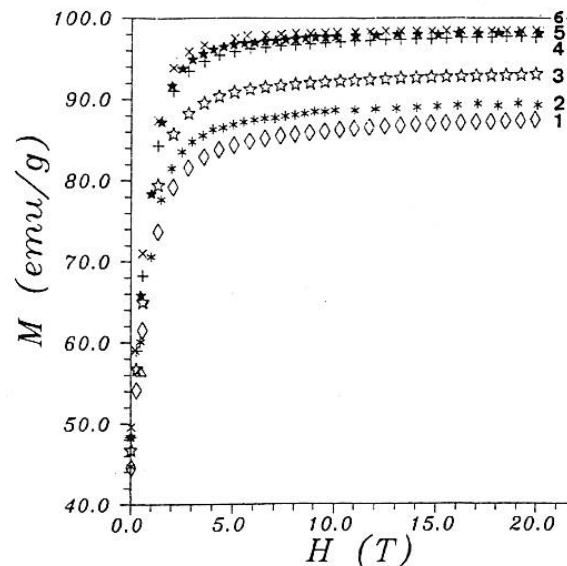
^b *Institut de Ciència de Materials, CSIC, Campus Universitari de Bellaterra, E-08093 Barcelona, Spain*

^c *Institut Laue–Langevin, 156X, 38042 Grenoble Cedex, France*

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Journal of Magnetism and Magnetic Materials 124 (1993) 228–238
North-Holland



Magnetic study of *M*-type doped barium ferrite nanocrystalline powders

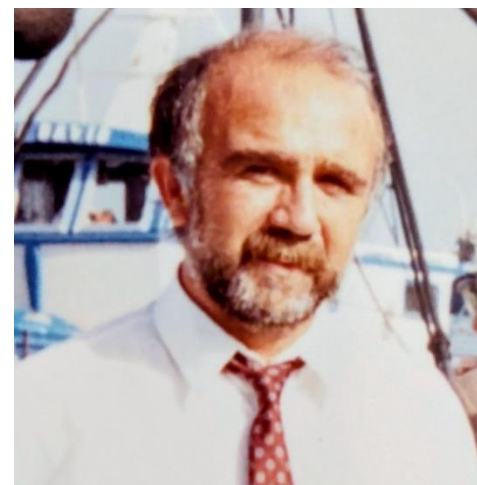
X. Batlle, ^{a)} M. García del Muro, and J. Tejada

Departament Física Fonamental, Universitat de Barcelona, Diagonal 647, 08028 Barcelona, Catalonia, Spain

H. Pfeiffer, P. Görnert, and E. Sinn

Institut für Physikalische Hochtechnologie, Helmholtzweg 4, 0-6900 Jena, Germany

(Received 8 June 1992; accepted for publication 2 May 1993)



Javier Tejada

The driving force during the last 30 years:
from microns to nanometers

Why nanoscience and nanotechnology?

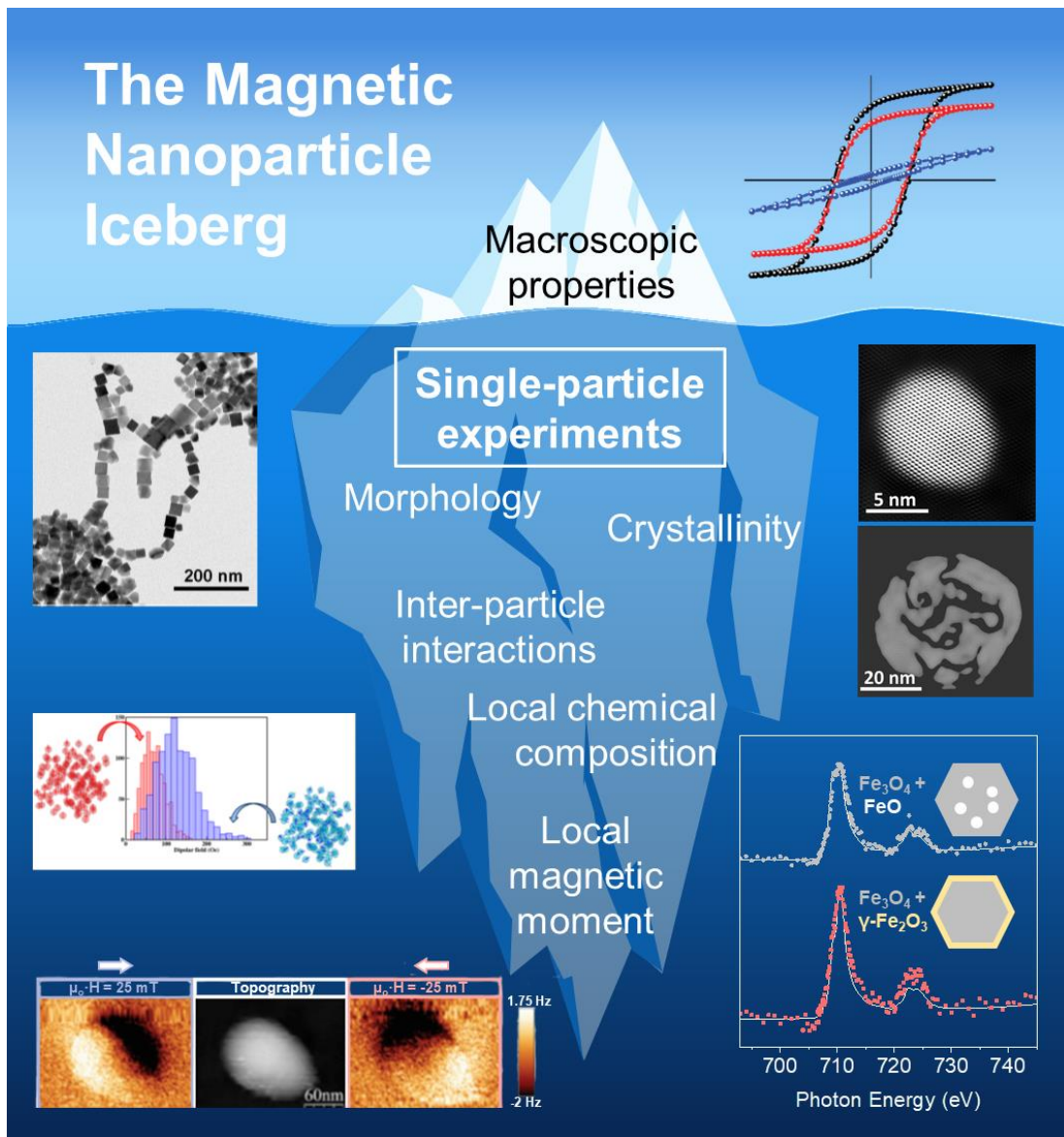
- Nanostructured (magnetic) materials
 - Basic entities, nanometer in size (e.g., magnetic nanoparticles)
- Why interesting? – New phenomena:
 - Feature size $\leq$ length scale

Magnetism: Exchange length, domain wall width and single domain

- Why useful? – New applications:
 - Magnetic recording (1-10 Terabit/in²) and sensors
 - Bioapplications

1993 - 2025

Main motto: (nano)structure sets the function



Fishing



Scuba diving

X. Batlle et al. JMMM **543** 168594 (2022)



TOPICAL REVIEW

Finite-size effects in fine particles: magnetic and transport properties

Xavier Batlle and Amílcar Labarta

M. García del Muro
Ph.D. 1998

Òscar Iglesias

Víctor (Franco) Puentes
Ph.D. 1998Kannan M. Krishnan
Berkeley 1997-98

Kevin O'Grady



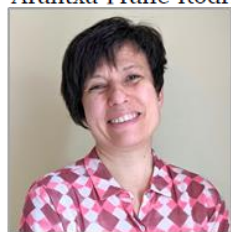
Contents lists available at ScienceDirect

Journal of Magnetism and Magnetic Materials

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

Research articles

Magnetic nanoparticles: From the nanostructure to the physical properties

Xavier Batlle^{a,b,*}, Carlos Moya^{b,c}, Mariona Escoda-Torroella^{a,b}, Òscar Iglesias^{a,b},
Arantxa Fraile Rodríguez^{a,b}, Amílcar Labarta^{a,b,*}

Arantxa Fraile-Rodríguez



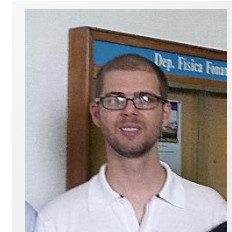
Carlos Moya



Puerto Morales



P. Guardia Ph.D. 2009



N. Pérez Ph.D. 2012



M. Escoda Ph.D. 2022

Fishing
(1993-2003)Scuba diving
(2004-2025)

International Conference on Fine Particle Magnetism 1991-2031

Rome 1991



Dino Fiorani



Barcelona 1999



Yokohama 2022 Bariloche 2025
Roma 2028 Thessaloniki 2031
2034????

PHYSICAL REVIEW B 66, 100401(R) (2002)

Entropy change and magnetocaloric effect in $\text{Gd}_5(\text{Si}_x\text{Ge}_{1-x})_4$

Fèlix Casanova, Xavier Batlle,* and Amílcar Labarta

Departament de Física Fonamental, Universitat de Barcelona, Avinguda Diagonal 647, 08028-Barcelona, Catalonia, Spain

Jordi Marcos, Lluís Mañosa, and Antoni Planes

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08028-Barcelona, Catalonia, Spain*

(Received 15 May 2002; published 3 September 2002)

PHYSICAL REVIEW B 72, 172402 (2005)

Giant heat dissipation at the low-temperature reversible-irreversible transition in Gd_5Ge_4

Fèlix Casanova, Amílcar Labarta, and Xavier Batlle*

Departament de Física Fonamental, Universitat de Barcelona, Diagonal 647, 08028-Barcelona, Catalonia

(Received 25 February 2005; revised manuscript received 21 July 2005; published 2 November 2005)



Fèlix Casanova, Ph.D. 2004



Exchange bias in heterostructures

PRL 114, 097202 (2015)

PHYSICAL REVIEW LETTERS

week ending
6 MARCH 2015

Exchange-Bias Phenomenon: The Role of the Ferromagnetic Spin Structure

R. Morales,^{1,2,*} Ali C. Basaran,³ J. E. Villegas,⁴ D. Navas,⁵ N. Soriano,⁶ B. Mora,⁶ C. Redondo,⁶
X. Batlle,⁷ and Ivan K. Schuller³



Ivan K. Schuller, Blanca/Max Batlle



Miguel Alario

Magnetic nanodots



PHYSICAL REVIEW B 81, 184417 (2010)

Development of vortex state in circular magnetic nanodots: Theory and experiment

J. Mejía-López,^{1,2} D. Altbir,^{2,3} P. Landeros,⁴ J. Escrig,^{2,3} A. H. Romero,⁵ Igor V. Roshchin,^{6,7} C.-P. Li,⁸ M. R. Fitzsimmons,⁹
X. Batlle,¹⁰ and Ivan K. Schuller⁸

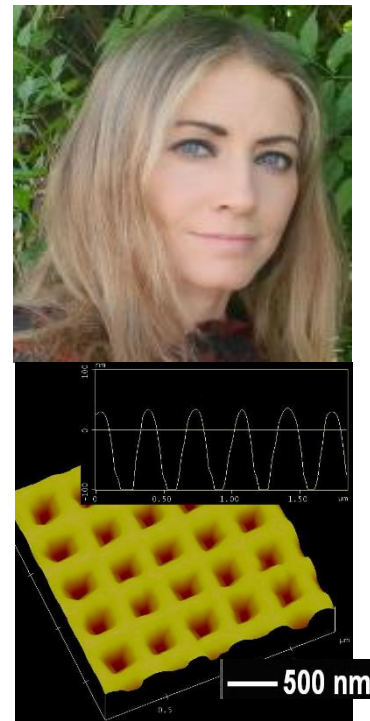
Exchange bias in nanostructures

APPLIED PHYSICS LETTERS 98, 152507 (2011)

Mirror symmetry in magnetization reversal and coexistence of positive and negative exchange bias in Ni/FeF₂

M. Kovyлина,^{1,a)} M. Erekhinsky,² R. Morales,³ I. K. Schuller,² A. Labarta,¹ and X. Batlle^{1,b)}

Miroslavna Kovyлина
Ph.D. 2011



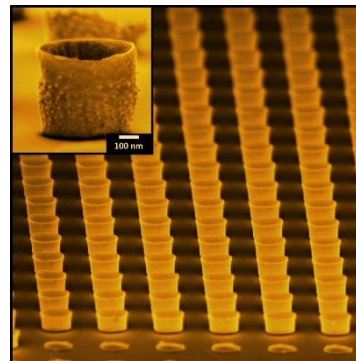
Plasmonics in ordered arrays of Au nanoelements

APPLIED PHYSICS LETTERS 107, 033102 (2015)



Au cylindrical nanocup: A geometrically, tunable optical nanoresonator

M. Kovylina,^{1,2,a)} N. Alayo,^{3,a),b)} A. Conde-Rubio,¹ X. Borrísé,⁴ G. Hibbard,² A. Labarta,¹ X. Batlle,^{1,c)} and F. Pérez-Murano^{3,c)}



Ana conde Rubio
Ph.D. 2018
(con Amílcar Labarta)

GROUP OF MAGNETIC NANOMATERIALS

DEPARTMENT OF CONDENSED MATTER PHYSICS. INSTITUTE OF NANOSCIENCE AND NANOTECHNOLOGY (IN2UB). UNIVERSITY OF BARCELONA



Visit our website!



A. Labarta



Xavier Batlle



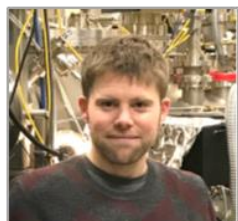
O. Iglesias



M. García del
Muro



A. Fraile
Rodríguez



E. Langenberg



A. I. Figueroa



C. Moya



J. Rodríguez
Álvarez
Ph.D. 2025
(A. Labarta/A. Fraile)



J. Ruiz Torres

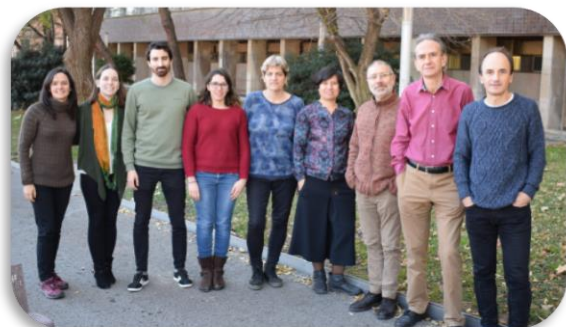


J. Ara

PhD students



Beñat Albizbeaskoetxea



<https://magneticnanomaterialsub.wordpress.com/>

Nanocaedro: Ciencia, Arte y Reflexión (2018)



L'àtom i els secrets quàntics
Les tres crisi