ACM’s New SIGCHI Extended Abstracts Sample File\*

|  |  |
| --- | --- |
| **First Author Gubbiotti** Specific Order of Authorship in Table Cells ACM, New York, NY gubbiotti@corporation.com | **Second Author Pam Malagò** Dipartimento di Fisica e Geologia P.O. Box 6221, Italy malago@affiliation.org |
| **Third Author Fin** Dipartimento di Fisica e Scienze P.O. Box 5000, Italy fin@affiliation.org | **Fourth (4th) Author Tacchi** Dipartimento di Fisica e Geologia P.O. Box 6221, Italy tacchi@affiliation.org |
| **Fifth Author 5. Giovannini** Dipartimento di Fisica e Geologia P.O. Box 6221, Italy giovannini@affiliation.org | **Sixth 6. Madami** **Seventh Author** **Ram** Dipartimento di Fisica e Geologia P.O. Box 6221, Italy madami@affiliation.org |

ABSTRACT[[1]](#footnote-2)

Two-dimensional arrays of bi-component. An abstract section is required for all TEI 2020 extended abstract submissions and should be about 150 words. To continue with your abstract text, authors will need to manually include the balance of text into column 2 on the next page. Use a good breaking point (like an end of a sentence).

KEYWORDS

ACM proceedings; text tagging; use semi-colons; to separate; your keywords

Note to Authors. Good Utilization of the Side Bar

Preparation: Do not change the margin dimensions and do not flow the margin text to the next page.

Materials: The margin box must not intrude or overflow into the header or the footer, or the gutter space between the margin paragraph and the main left column.

Images & Figures: Practically anything can be put in the margin if it fits.

Moving the Keywords to the side bar on the 2nd page will help reduce space used **(see for example to the left).**

INTRODUCTION (MAIN SECTION HEADS ~ ALL CAPS)

Sample Text for Introduction and body text should be in 10 pt. Linux Biolinum. In the last decade, there has been an intense research activity in studying the spectrum of magnetic eigenmodes both in single and multi-layered confined magnetic elements with different shape and lateral dimensions [[1](#bib1)–[3](#bib3)]. This interest has been further renewed by the emergence of the spin-transfer torque effect, where a spin-polarized current can drive microwave frequency dynamics of such magnetic elements into steady-state precessional oscillations. Moreover, the knowledge of the magnetic eigenmodes is very important also from a fundamental point of view for probing the intrinsic dynamic properties of the nanoparticles. Besides, dense arrays of magnetic elements have been extensively studied in the field of Magnonic Crystals (MCs), that is magnetic media with periodic modulation of the magnetic parameters, for their capability to support the propagation of collective spin waves [[4](#bib4), [5](#bib5)]. It has been demonstrated that in MCs the spin wave dispersion is characterized by magnonic band gaps, i.e. a similar feature was already found in simple two-dimensional In addition to this, complex periodic arrays of dipolarly coupled magnetic dots are of special interest because they can support the propagation of non-reciprocal spin waves, i.e. ((*k*) ≠ (−*k*)), where  is the angular frequency and *k* is a wave vector, which could find application in the signal transmission and information processing as well as in the design of microwave isolators and circulators.

FORMATTING FOR SECTION HEADS, 10 PT LINUX BIOLINUM BOLD, ALL CAPS

Accessibility (Sub-Section Heads, Upper & Lower Case, 10 pt. Linux Biolinum Bold)

Body Text should be 10 pt. Linux Biolinum (not bold). The Executive Council of SIGCHI has committed to making SIGCHI conferences more inclusive for researchers, practitioners, and educators with disabilities.

Specifically, we encourage authors to carry out the following five steps:

• Add alternative text to all figures

• Mark table headings

• Generate a tagged PDF

• Verify the default language

• Set the tab order to “Use Document Structure”

For links to instructions and resources, please see: <http://chi2016.acm.org/accessibility>

Unfortunately good tools do not yet exist to create tagged PDF files from Latex, see the ongoing effort at http://tug.org/twg/accessibility/



Figure 1: MOKE hysteresis loop for the bi-component Py/Co dots array measured along the dots long axis.

LATEX users will need to carry out all of the above steps in the PDF directly using Adobe Acrobat, after the PDF has been generated. For more information and links to instructions and resources, please see: <http://chi2016.acm.org/accessibility> and <http://tug.org/twg/accessibility/>

Producing & Testing Your PDF Files

*ACM DL Requirements.* We recommend that you produce a PDF version of your submission well before the final deadline. Your PDF file must be ACM DL Compliant and meet stated requirements, <http://www.scomminc.com/pp/acmsig/ACM-DL-pdfs-requirements.htm>

*Testing Your PDF.* Test your PDF file by viewing or printing it with the same software the chairs and ACM DL users will use, Adobe Acrobat Reader Version 10. This is widely available at no cost. Note that most reviewers will use a North American/European version of Acrobat reader, so please check your PDF accordingly.

References Format

BLS Your references should be published materials accessible to the public. Internal technical reports may be cited only if they are easily accessible and may be obtained by any reader for a nominal fee. Proprietary information may not be cited. Private communications should be acknowledged in the main text, not referenced (e.g., [Golovchinsky, personal communication]). References must be the same font size as other body text. References should be in alphabetical order by last name of first author. Use a numbered list of references at the end of the article, ordered alphabetically by last name of first author, and referenced by numbers in brackets [1]. For papers from conference proceedings, include the title of the paper and the name of the conference. See sample references list at the end of this sample file.

Language, Style, and Content

The written and spoken language of SIGCHI is English. Spelling and punctuation may use any dialect of English (e.g., British, Canadian, US, etc.) provided this is done consistently. Hyphenation is optional. To ensure suitability for an international audience, please pay attention to the following:

* Write in a straightforward style. Use simple sentence structure. Try to avoid long sentences and complex sentence structures. Use semicolons carefully.
* Use common and basic vocabulary (e.g., use the word “unusual” rather than the word “arcane”).
* Briefly define or explain all technical terms. The terminology common to your practice/discipline may be different in other design practices/disciplines.
* Spell out all acronyms the first time they are used in your text. For example, “World Wide Web (WWW)”.
* Explain local references (e.g., not everyone knows all city names in a particular country).

**Table 1:** Frequency of Special Characters

|  |  |  |
| --- | --- | --- |
| *Non-English or Math* | *Frequency* | *Comments* |
| Ø | 1 in 1,000 | For Swedish names |
| $ | 4 in 5 | Used in business |
| Ø2 | 2 in 1,000 | For Swedish names |
| $2 | 6 in 5 | Used in business |
| Ø3 |  |  |

* Explain “insider” comments. Ensure that your whole audience understands any reference whose meaning you do not describe (e.g., do not assume that everyone has used a Macintosh or a particular application).

Sample Text & Equations are here. For each micromagnetic cell the reduced magnetization takes the form where themagnetization (saturation magnetization) in the *k-*th cell; note that the saturation magnetization now depends on the ferromagnetic material through the index *k*. Hence, in a polar reference frame

|  |  |
| --- | --- |
|  | (1) |

where is the azimuthal (polar) angle of the magnetization (the time dependence is omitted). The second derivatives of the energy density depend on the micromagnetic cell indexes, and through them on the material index corresponding either to Py or Co.

Note that, exchange contribution is set equal to zero, because in each unit cell the two elliptical dots are separated. Moreover, the uniaxial anisotropy energy density of Co is neglected [Table 1](#tb1).

|  |  |
| --- | --- |
|  | (2) |

Therefore one can observe either an in-phase (acoustic) or an out-of-phase (optical) character of the modes, with respect to the precession of the in-plane magnetization components in adjacent Py and Co dots.

We would like to mention that the DMM presents several advantages with respect to OOMMF for calculating the spectrum of magnetic eigenmodes for the following reasons: *a*) There is no need to excite the system by any magnetic field pulse, *b)* A single calculation llows to determine the frequencies and eigenvectors of all spin-wave modes of any symmetry, *c*) The spectrum is computed directly in the frequency domain, *d*) The mode degeneracy is successfully solved, *e*) The spatial profiles of the spin-wave modes are directly determined as eigenvectors and, finally, *f*) The differential scattering cross-section can be calculated accurately from the eigenvectors associated to each spin-wave mode. This is a clear indication that both the Py and Co sub-elements are in a single domain state where Py and Co magnetizations are all oriented with their magnetic moment along the chain and field direction. At point ** (*H* = −372 Oe) of the hysteresis loop, where the plateau is observed in the *M*-*H* loop, the dark and bright spots of the Py dots are reversed with respect to those of Co, accounting for an antiparallel relative alignment of magnetization.



Figure 2: MFM images of the bi-component Py/Co dots for different values of the applied magnetic field which are indicated by greek letters along both the major and minor hysteresis loop.



Figure 3: Dependence of the magnetic eigeinmode wave frequency on the applied field strength.



Figure 4: Calculated spatial distribution of the in-plane dynamic magnetization.

RESULTS AND DISCUSSION

Magnetization Curves and MFM Characterization

The major hysteresis loop measured by MOKE, plotted in [Fig. 1](#fig1), displays a two-step switching process due to the distinct magnetization reversal of the Py and Co sub-elements, characterized by a different coercivity. We performed a field-dependent MFM analysis whose main results are reported in [Fig. 2](#fig2). At large positive field (*H*= +800 Oe, not shown here) and at remanence (** point of the hysteresis loop of [Fig. 1](#fig1)), the structures are characterized by a strong dipolar contrast due to the stray fields emanated from both the Py and Co dots.

We have also used MFM to measure the magnetic configurations along the minor hysteresis loop, described above. Once the AP ground state has been generated at *H*= −500 Oe, the applied field is increased in the positive direction. The MFM image taken at point of [Fig. 2](#fig2), remanent state of the minor loop (*H* = 0), shows that the AP state is stable and remains unchanged until the magnetic field is increased up to +300 Oe where the Py magnetization reverses its orientation and returns to be aligned with that of Co dots. On the basis of the above MFM investigation, one can say that the structures are always in a single domain state, while the relative magnetization orientation between the adjacent Py and Co elements depends on both the field value and the sample history.

Field Dependent BLS Measurements and DMM Calculations

[Fig. 3](#fig3) displays the frequencies of BLS peaks plotted as a function of the applied field magnitude starting from positive values. The field is then decreased and reversed following the upper branch of the hysteresis loop, shown in the same figure. Up to five peaks are measured in the spectra, as shown in spectrum measured at H = 0 Oe in the [Fig. 3](#fig3) inset, and their field evolution analyzed over the whole field range investigated. The detected modes are identified and labeled on the basis of their calculated spatial profiles, shown in [Fig. 4](#fig4) for *H*= 500 and −500 Oe. They exhibit marked localization into either the Co or the Py dots, as stated at the end of the previous Section, were it was introduced the labelling notation containing the dominant localization region (either Py or Co) and the spatial symmetry (EM, F, DE, etc).

When the dots are in the P state, up to five modes were detected in BLS spectra. On the basis of the calculated profiles (right panel of [Fig. 4](#fig4)), we identified in the P state the two modes at lowest frequencies as the EM(Py) and the F(Py), with a very small spin precession amplitude into the Co dot. This is because for this material we are below the frequency threshold for the existence of spin waves. A similar effect has been observed in periodic array of alternating Permalloy and Co nanostripes

The reason of this complex behavior will be addressed in the following, analyzing the interplay of both static and dynamic dipolar coupling between the adjacent Py and Co dots [Table 2](#tb2).

Table 2: Comparison of Coefficients from Atomistic

|  |  |  |
| --- | --- | --- |
| *Atm* | *MS-CG* | *MS-CG/DPD* |
| 1.78 | 14.32 | 1.74 (−2%) |
| 0.43 | 31.00 | 0.40 (−7%) |
| 0.062 | 15.61 | 0.048 (−23%) |
| 0.032 | 9.76 | 0.024 (−24%) |
| 0.020 | 4.66 | 0.015 (−25%) |
| 0.012 | 2.32 | -”- |
| 0.0076 | 0.016 | -”- |

ACKNOWLEDGMENTS

This work was partially supported by the MIUR-PRIN 2010–11 Project 2010ECA8P3 “Dy Nano Mag” and by the National Research Foundation, Prime Minister’s office, Singapore under its Competitive Research Programme (CRP Award No. NRF-CRP 10-2012-03).

CONCLUSIONS

In summary, we have performed both an experimental and theoretical study of the spin eigenmodes in dipolarly coupled bi-component cobalt and permalloy elliptical nanodots. Several eigenmodes have been identified and their frequency evolution as a function of the intensity of the applied magnetic field has been measured by Brillouin light scattering technique, encompassing the ground states where the cobalt and permalloy dots magnetizations are parallel or anti-parallel, respectively.

**REFERENCES**

1. All references should be in the alphabetical order by last name of the first author. See how the reference list is numbered with square brackets using the WORD settings, 8 pt. Linux Biolinum and justified text (flush left and right), text indent hang off the numbering. **It is mandatory to use the square brackets for the references numbered list.**
2. Ivan Poupyrev, Mark Billinghurst, Suzanne Weghorst, and Tadao Ichikawa. 1996. The go-go interaction technique: non-linear mapping for direct manipulation in VR. In *Proceedings of the 9th annual ACM symposium on User interface software and technology (UIST ’96).* ACM, New York, NY, USA, 79-80. DOI: <http://dx.doi.org/10.1145/237091.237102>
3. James T Reason and Joseph John Brand. 1975. Motion sickness. Academic press.
4. F.N.M Surname, Article Title, https://www.acm.org /proceedings-template.
5. F.N.M Surname and F.N.M Surname, 2018. Article Title, The title of book two (2nd. ed.). Publisher Name, City, State, Country, page count, and DOI if available.
6. Saiganesh Swaminathan, Thijs Roumen, Robert Kovacs, David Stangl, Stefanie Mueller, and Patrick Baudisch. 2016. Linespace: A Sensemaking Platform for the Blind. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16).* ACM, New York, NY, USA, 2175-2185. DOI: https://doi.org/10.1145/2858036.2858245
7. TUG 2017. Institutional members of the TEX Users Group. Retrieved May 27, 2017 from <http://wwtug.org/instmem.html>
8. Boris Veytsman. [n. d.]. acmart—Class File & sigchi-a style file for typesetting publications of ACM SIGCHI. Retrieved May 27, 2017.
9. Rick Wash. 2010. Folk models of home computer security. *Proc. SOUPS ‘10,* ACM Press, 1. <http://doi.org/10.1145/1837110.1837125>
10. Alvin Yeo. 1998. Cultural effects in usability assessment. In CHI 98 Conference Summary on Human Factors in Computing Systems, 74–75. <https://doi.org/10.1145/286498.286536>

1. \*Produces the permission block, and copyright information. See the specific order to use the table cells to include the authors in the order you want yourself and your co-authors to be listed. Use footnotes sparingly, avoid using them. There is a **white text** number 1 after the ABSTRACT heading to maintain this ACM copyright block space.

   Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

   AHs’21 Extended Abstracts, February 22-24, 2021, Rovaniemi, Finland.

   © 2021 Copyright is held by the author/owner(s).

   ACM ISBN XXXXXXX XXXXXXX.

   DOI: https://doi.org/ XXXXXXX / XXXXXXX.XXXXXXX [↑](#footnote-ref-2)