



NIMFEIA

Deliverable D1.10

Dissemination and Exploitation Plan

Project number	101070290
Project name	Nonlinear Magnons for Reservoir Computing in Reciprocal Space
Project acronym	NIMFEIA
Work package	WP1 Management, dissemination and exploitation
Type	Report
Dissemination level	Public
Lead beneficiary	HZDR
Due date of delivery	Month 6 – March 2023

1. Introduction

This document is the first version of the Dissemination and Exploitation Plan (DEP) of the project *Nonlinear Magnons for Reservoir Computing in Reciprocal Space* (NIMFEIA), funded by the European Union under the call *HORIZON-CL4-2021-DIGITAL-EMERGING-01-14 - Advanced spintronics: Unleashing spin in the next generation ICs (RIA)* with grant agreement number 101070290. NIMFEIA started in October 2022 and will run for four years. Its main objective is to provide a novel hardware solution for brain-inspired reservoir computing using magnetic materials on the nanoscale combined with advanced spintronic technologies.

This plan is written against the background of the NIMFEIA objectives with the purpose to define the dissemination and exploitation activities to be carried out during the project.

2. Dissemination activities

To promote the NIMFEIA project and its results, we identify different target groups, each requiring a different presentation approach.

2.1. General public

To reach the general public, we will specifically design adapted communication material to support the dissemination of NIMFEIA. This includes setting up online communication resources like press releases on project advancements written in English language but also in the mother languages at the partners' institutions and the NIMFEIA website. The HZDR partner possesses extensive experience in producing 3D computer graphics with strong visual aesthetics which will be invaluable for creating memorable visual elements and easy-to-follow explanations of the underlying physic for the general public.

Furthermore, the NIMFEIA partners will promote their research activities by participating in open days and other events such as Mainz Science Market, Dresden Long Night of Science, Pint of Science, Science week festival, European Researchers' Night, Nanoscience for pupils, etc. Furthermore, we will produce at least two videos per year, one promoting the results of the NIMFEIA project and one brief lecture, to be posted on our website.

2.2. BSc and MSc students

Young students are the foundation of Europe's future. We aim to wake interest in scientific studies in general, and for the research activities of the NIMFEIA project specifically, to prepare them for the future European knowledge-based ICT society. We will promote the research and its results at open days, national science days, and regional initiatives to promote the communication of science to society. For Ph.D. students trained in the NIMFEIA project, we will promote their attendance at (inter)national conferences and summer schools, such as those organized yearly by the IEEE Magnetics Society or the European Magnetism Association, to foster knowledge and curiosity beyond their specific research topic. Furthermore, partners of the NIMFEIA consortium will organize extended exchange visits for their students.

2.3. Academia

NIMFEIA builds on a lot of preceding fundamental research which is now transformed into a revolutionary concept shifting paradigms in reservoir computing towards operating in reciprocal space. Hence, we anticipate that the NIMFEIA project will generate scientific results warranting publication in high-impact journals including, but not limited to, Nature family journals, Science, Physical Review Letters, Nano Letters, Physical Review B, etc. Preference will be



given to gold open-access journals. Particular attention will be paid to offering development perspectives that shall stimulate research and build bridges between different communities.

We expect the results of the NIMFEIA project to generate large interest not only in the communities of spintronics and magnonics but also beyond. This will allow us to disseminate our work to a broad audience via contributed and invited talks. As a result of the Corona pandemic, there has been a shift towards organizing conferences and workshops online or in a hybrid format which allows scientists from around the world to gather more easily. Still, we believe that scientific advancement thrives from personal face-to-face discussions so members of the NIMFEIA consortium will try to find a balanced mix between online and in-person participation in (inter)national conferences and workshops, such as Material Research Society (MRS) conferences, March Meetings from the American and German Physical Society, Magnetism and Magnetic Materials (MMM), Joint European Magnetic Symposia (JEMS), Magnonics Workshop, IEEE Intermag, International Green and Sustainable Computing Conference (IGSC), International Conference on Artificial Neural Networks (ICANN), International Electron Devices Meeting (IEDM), etc.

Towards the end of the project, the NIMFEIA partners will organize a 3-day international scientific workshop bringing together major actors in the fields of or adjacent to spintronics and magnonics as well as researchers involved in photonic reservoir computing. This workshop will gather around 20 invited speakers and will promote the research undertaken in NIMFEIA to the scientific community across various disciplines.

2.4. Industry

Part of our communication strategy will focus on industry and the communities outside spintronics and magnonics. The overall process followed towards the development of the industrial communication strategy will be to (i) consider the target audiences related to their market segments and special needs; (ii) ensure that the message is clearly defined and addresses the needs of each target audience; (iii) select/fine-tune the communication activities. Besides taking advantage of the extensive network provided by our two industrial partners, we will actively participate in industry exhibitions and fairs on a national and international level. Furthermore, we aim to approach the industry, especially locally operating SMEs, directly in their mother tongue. Our proposed concept of reservoir computing in reciprocal space and the idea of making devices larger instead of smaller is so fundamentally different from existing technologies that direct communication to the industry is paramount for our technology to become successful.

3. Exploitation activities

Innovation management is key to bringing NIMFEIA's technology to the market. With an active innovation strategy, we aim to protect any valuable innovations while at the same time striving to publish all scientific results openly. To achieve both of these goals, the key issue is timing and discovering innovations that should be considered for further development at an early stage. This allows for securing intellectual property rights (IPR) early on. For that purpose, the NIMFEIA consortium will be supported by the HZDR Innovation GmbH which was launched in 2011 by NIMFEIA's coordinating institution HZDR with the aim of nourishing innovation in science and transferring novel technologies to industry. As a spin-off, it realizes commercial production of research innovation prototypes and manages industry contacts for the commercial use of scientific large-scale facilities. The HZDR Innovation GmbH supports the transfer of research results and their transformation into successful start-up companies. Dedicated fund-



ing schemes such as the Helmholtz Enterprise program support scientists to work entrepreneurial and start a well-thought-out business.

During the NIMFEIA project, early identification of innovations will be targeted at consortium meetings. The Dissemination and Exploitation Committee (DEC) will monitor the project for innovations, providing advice and guidance in innovation management and intellectual property rights. The DEC will aim to assess the potential of inventions for applications, support technology transfer, and develop systematic exploitation strategies. In the case of joint inventions which arise from the cooperative research of all NIMFEIA partners, the joint filing of patents is encouraged. Each work package leader will be responsible for identifying potential inventions and reporting them to the DEC. The subsequent evaluation of the idea and market research will be performed by the DEC supported by local technology transfer executive offices of the partners. The DEC will take care of timely IP protection.

4. Overview of dissemination and exploitation activities

The following table summarizes the dissemination and exploitation activities of the NIMFEIA project.

Target group	Goals	Actions	Timeframe
General Public	<ul style="list-style-type: none"> • Create awareness of the aims of NIMFEIA • Create awareness of breakthroughs • Create awareness of progress in digitization and its impact on energy consumption 	<ul style="list-style-type: none"> • Sharing news on website • Public lectures festivals • Visibility in Newspapers • Press releases on partner’s website in English and mother tongue • Promotional videos 	Monthly 1-2/year 1-2/year 1-2/year 1-2/year
Primary/ High School students	<ul style="list-style-type: none"> • Stimulate children and students for science • Inspire students for physics of magnetism 	<ul style="list-style-type: none"> • Magic-of-magnetism experiments at high schools • Lectures at open days • Lecture Pre-University College 	Yearly Yearly Yearly
BSc and MSc students	<ul style="list-style-type: none"> • Education in aims of NIMFEIA • Practise presentation of results • Education in working on innovations 	<ul style="list-style-type: none"> • Lectures at master courses • Discussion meetings • Group seminars • Arrange internships in industry • Stimulate mixed career paths • Promote attendance of summer schools • Arrange extended exchange visits of students at partner institutions 	1-2/year Weekly Weekly 1/year
Academia	<ul style="list-style-type: none"> • Share research outcomes • Trigger external input for NIMFEIA • Stimulate experimental verification 	<ul style="list-style-type: none"> • Publications • Talks at (inter)national conferences and workshops • Organization of workshops and seminars • Joint research bridging theory and experiment 	3-5/year >10/year



Industry	<ul style="list-style-type: none"> • Stimulate exploitation of reciprocal space computing • Disseminate open source software • Stimulate application discoveries • Protect intellectual properties 	<ul style="list-style-type: none"> • Industry exhibitions and fairs • Organize workshops and outreach events at partner facilities • Promote internships • Collaborative proposals (EU-EIC, NWO-Industrial Partners Program, BMBF) • DEC meetings • Patent filing 	<p>(Bi)annual</p> <p>(Bi)annual</p> <p>Yearly</p> <p>Yearly</p>
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