

Curriculum Vitae of Xiufeng Han

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I. Biographical Statement

Dr. Xiufeng Han is a full professor at the Institute of Physics (IOP) of the Chinese Academy of Science (CAS). During his tenure there, he founded the “Spintronics Materials, Physics and Devices” group-M02 in 2002 and has led it ever since with remarkable success.

Prof. Han obtained his Bachelor of Science from Lanzhou University in 1984, and graduated with a Masters (1990) and a PhD (1993) from Jilin University, where he was a lecturer. He was appointed as Associate Professor at the Institute of Semiconductors of the CAS in 1996, and actively developed his overseas contacts during the period (1998-2002) when he worked as a JSPS Foreign Researcher at Tohoku University (Japan) and at Trinity College (Ireland). He also spent time visiting the CNPq in Rio Janeiro (Brazil) and the University of New Orleans (USA).

In recognition of his promise and achievements, he was invited back to the position of full professor at the IOP in 2002 and established the first full-chain research group and laboratory on “Spintronics Materials, Physics, and Devices” in China, enabling his group to make cutting-edge advances in the field. He received funding as a Distinguished Young Scholar from National Natural Science Foundation of China (NSFC) in 2003 and has been honoured twice with the NSFC Spintronics Outstanding Innovation Team Foundation Award, in 2007 and 2010. He also received 15 international joint and visiting funding from bilateral scientific cooperation agreements of China with Finland, France, Germany, Ireland, Russia, UK, Japan, Pakistan, Australia and Brazil spanning the period 2003~2027, which have supported 60 bilateral exchange visits. He is a worldwide leader in his field, collaborating with 300 renowned foreign scientists and publishing 247 collaborative papers with colleagues from Europe, North America, Asia, and beyond.

II. Research Interests and Achievements

Xiufeng Han’s major research area is Spintronics, Magnonics and Magnetism, (including materials, physics, and devices). His expertise spans the following domains: ① Spintronic Materials, Physics and Devices [1999~present]. ② Magnonic Materials, Physics and Devices [2012~present]. ③ Rare-earth transition metal compounds, including fabrication, crystal field theory of nitride and carbide permanent magnets [1987~1998]. He has co-published 500 peer-reviewed papers and is co-author of 110 patents. He has presented more than 70 invited talks at international conferences. Representative achievements and contributions are as follows:

(1) Conception, design, and fabrication of a series of cutting-edge spintronic and magnonic devices, including nanoring or nano-elliptical-ring MTJs (2006) and the nanoring magnetic random access memory (Nanoring STT-MRAM, 2006) demonstrator, Nanoring-MTJ-based spin nano-oscillator/microwave detectors (2006-2018), Nanoring Spin Random Number Generator (Spin RNG, 2006-2018); Double-barrier MTJ-based single-quantum-well (QW) and triple-barrier MTJ-based dual-QW Spin Resonant Tunnelling Diodes (Spin RTD, 2006-2019), Spin Light-Emitting Diode (Spin LED, 2012-2024); high-sensitivity and low-noise TMR Sensors based on double indirect exchange-biased MTJs (2010~present); novel Y & T-type spin-orbit torque (SOT) MTJs and SOT-MRAM devices (2009~present), nonvolatile multifunctional programmable SOT-Spin Logic, probability-manipulated Spin RNG and Restricted Boltzmann Machines based on SOT-MTJs (2009~present); Magnon Heterojunction/Generator/Detector, Magnon Valve, Magnon Junction, Magnon Transistor, and Magnon Field Effect Transistor (MFET), among others (2012~present). The double indirect

exchange-biased TMR magnetic sensors [ZL 201010195799.6; US 9,568,564 B2] he developed have been successfully tested for practical applications in some domestic smart power grids, and they have proven to be highly sensitive and low in noise.

(2) Theoretical predicted or experimental observation of ten novel spin and magnon quantum effects, including quantum-well resonant tunnelling magnetoresistance (QW-TMR), spin-dependent Coulomb blockade magnetoresistance (CBMR), magnon valve effect (MVE), magnon junction effect (MJE), magnon blocking effects (MBE), magnonic nonlocal spin-Hall magnetoresistance (MNSMR), magnon transfer torque (MTT) effect, magnon resonant tunnelling (MRT) and magnon resonant transmission (MRT) effect, magnon-mediated electron current drag (MECD) effect, and the magnon skin effect (MSE), etc.

III. Academic monograph publication and distribution status

His wide experience in Spintronics, inspired Prof. Han to edit the widely acclaimed “Introduction to Spintronics,” published in Chinese, in 2014. The work is in two volumes, with 28 chapters, and more than 50 collaborating authors. It has sold 7500 copies and there have been 89900 single-chapter downloads. The work has been adopted as professional course material by some Chinese universities. He also contributed to four other monographs in Chinese or English, and wrote the chapter “Ferromagnetic Nanowires and Nanotubes” in “Electrodeposited Nanowires and their Applications” (Intech, 2010) which was downloaded over 8,000 times during 2010~2018.

IV. Significant Awards and Honors

- (1) Election to a Fellow of the European Academy of Sciences (EurASc) in 2024.
- (2) AUMS Award 2018, Awarded by Asian Union of Magnetics Societies in ICAUMS 2018.
- (3) The First Rank Prize of Science and Technology (for Nanoring STT-MRAM achievement), 2013, Awarded by the Committee of Science and Technology, Beijing.

V. International Academic Exchange, Cooperation, Education, and Organization

Prof. Han leads a research team that has collaborated with 300 renowned foreign scientists from 25 countries all over the world and has published 247 joint papers. Since 2002, he has supervised 60 PhD students, some of whom have been outstandingly successful as researchers, professors, engineers and managers. Since 2014, he has served as co-editor of the *J. Magn. Magn. Mater.* where he has handled 2100 articles over the past 9 years. He is a member of the Editorial Board of other scientific journals, including *SPIN*, *Sensors*, and *Chinese Physics*, etc. He has served as referee for *Nature* journals, *Phys. Rev. Lett.* and other *APS* journals, *Appl. Phys. Lett.*, *J. Appl. Phys.*, *Nano Lett.*, *Adv. Mater.* journals, *IEEE* journals, and completed reviews of 400 submissions.

In addition to his editorial work, he has also played a pivotal advisory role in organizing conferences and symposiums. He has had a distinguished record of service, acting as first Chair and one of the Founders of the IEEE Magnetic Society Beijing Chapter (2010-2012). He was elected to Administrative Committee of the IEEE Magnetics Society (2021-2024). He also served as one of promoters, organizers and program co-chairs of the InterMag 2015 Conference in Beijing, InterMag is a leading international applied magnetics conference held only occasionally in Asia. The conference attracted a great number of submissions (2500), presentations (1700), and attendees (1700); making it one of the most successful meetings of its kind. Prof. Han is a sought-after speaker and has been invited to address many conferences including the 2005 APS March Meeting, the MMM 2007 Conference in Tampa, InterMag 2011 in Taipei, InterMag 2020 in Montreal, the 2021 CPS Fall Meeting in Lanzhou, the Joint MMM-InterMag Conference 2022 in New Orleans, and InterMag 2024 in Rio de Janeiro.