Preface

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The 32nd International Conference on the Applications of the Mössbauer Effect was held in Opatija, Croatia. The Organizing Committee is grateful to the international committee for their valuable support and assistance in conference programme preparation, specially to Prof. Michael Reissner and Prof. Layos Dénes Nagy for their continuing advice. We sincerely hope that this short report on ICAME 2013 will remind many participants of the scientific and social programmes that we all enjoyed in Opatija.

We are also pleased that the conference took place in the first week of September, with the balmy weather creating a very special atmosphere, as reflected on the participants' smiling faces.

The ICAME 2013 organization was awarded to our research group at the 2009 IBAME meeting in Vienna when Opatija, a tourist resort on the Istrian peninsula in the Adriatic, was accepted as the conference venue. The preparations started immediately upon return from Vienna and four years on we hosted a meeting of the Mössbauer community representatives consisting of many well-known spectroscopists as well as those who recently joined the community. In particular we have all been pleased to see that many young people participated in the ICAME 2013 and presented their research either as a short oral or a poster presentation. The participation of women was also considerable.

The number of registered participants was 251 from 46 different countries on five continents (174 regular participants, 77 students), plus 6 exhibitors and 40 accompanies. In the end 211 regular participants and students and 32 accompany persons turned out in Opatija. The ICAME 2013 programme consisted of four tutorial lectures, one plenary and sixteen invited lectures, 59 short oral and 200 poster presentations.

Proceedings of the 32nd International Conference on the Applications of the Mössbauer Effect (ICAME 2013) held in Opatija, Croatia, 1–6 September 2013

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The tutorial session, arranged on a Sunday afternoon, was balanced between the applications of Mössbauer spectroscopy using standard laboratory equipment and the use of modern synchrotron techniques. The tutorial programme comprised four lectures: *Characterization of sophisticated oxide glass by Mössbauer spectroscopy* by Tetsuaki Nishida, *Diffusion studies: from quasielastic Mössbauer spectroscopy to modern synchrotron techniques* by Bogdan Sepiol, *Relaxation phenomena in growing magnetic nanostructures* by Kai Schlage and *Mössbauer parameters: unusual/atypical behavior versus classical one* by Georges Filoti.

It was a coincidence, or maybe not, that the ICAME 2013 opening ceremony took place on 1st September 2013, just at the time when the energy-domain synchrotron Mössbauer source (SMS) at the European Synchrotron Radiation Facility (ESRF) went to user mode. That exciting news from ESRF was reported by Layos Dénes Nagy on behalf of Rudolf Rüffer who was unable to come to Opatija himself. “*In contrast to time-domain nuclear resonant scattering of synchrotron radiation, SMS will be operational in any bunch mode of the synchrotron, this will dramatically increase the overall synchrotron beamtime available for the Mössbauer community and will make possible performing of special experiments, which were impossible before. This is an event in the history of Mössbauer spectroscopy that can only be compared to Mössbauer’s first experiment in 1957 and to Gerdau’s first NRS experiment in 1984*” were Dénes exciting words.

The plenary lecture “*New mineral-related materials*” was given by Frank Berry who presented the synthesis of new mineral-related structures in which cation oxidation states can be controlled changing their physical, e.g. functional properties. This allows a controllable synthesis of materials with desired functional properties. Mössbauer effect applications in materials science (metallic glasses, magnetic materials, superconductors, catalysts, batteries, rare-earth intermetallics, corrosion products) were the subject of many invited talks which demonstrated the state-of-the art in Mössbauer effect applications. In one of those talks Israel Nowik reported his early results on testing the Second Order Doppler Shift (SODS) in highly accelerated systems by Mössbauer spectroscopy, with a view to testing Einstein’s clock hypothesis. Jorg Evers reviewed recent theoretical and experimental progress in the development of nuclear quantum optics with hard X-rays, while Makina Saito talked about the use of 57-Fe nuclear resonant scattering (NRS) of synchrotron radiation, which is a time-domain analogue of the Rayleigh scattering Mössbauer radiation method, in the understanding of glass transition and molecular dynamics in a supercooled liquid. Gerardo F. Goya reviewed tailoring Fe-oxide nanoparticles for biomedicine. Recent progress in the field was discussed.

Progress in Mössbauer effect applications was additionally presented in the form of short oral and poster presentations, grouped under ten conference topics, viz. T1 Materials science (generally), T2 Nanostructured materials, T3 Different chemical applications, T4 Solid-state physics and magnetic materials, T5 Applications in biology and medicine, T6 Applications in environmental research, T7 Earth science, mineralogy and fine arts, T8 Lattice dynamics and theory of hyperfine interactions, T9 Advances in Mössbauer instrumentation (generally) and synchrotron Mössbauer spectroscopy, and T10 Industrial applications.

One of the major events at the ICAME-2013 was granting the IBAME Science Award for Chemical Energy Conversion to Eckhard Bill of the Max Planck Institute, Mulheim/Ruhr,

Germany. He was invited to receive the award and deliver his lecture “*Molecular iron complexes at the limits of classical valence assignments*”. He made a significant contribution to the study of chemical compounds such as hydrogenases and nitrogen converting enzymes with iron sites in low-spin and low valence state by using spectroscopy-biased quantum-chemical calculations to interpret the Mössbauer parameters. Our congratulations to Eckhard!

It is a general consensus among the ICAME 2013 participants that the scientific achievement level of the conference was high.

In the final session at the closing ceremony, Ralf Rohlsberger (DESY, Hamburg) presented the ICAME 2015 to be held in Hamburg and enthusiastically took the Chair’s responsibility together with Goester Kligenhofer (University of Mainz) and Volker Schönemann (University of Kaiserslautern). We trust that the reminiscences of Opatija will remain vivid until our forthcoming convention in Hamburg.

WELCOME ADDRESS OF THE DIRECTOR GENERAL OF THE RUĐER BOŠKOVIĆ INSTITUTE, ZAGREB, Dr. TOME ANTIČIĆ

It is a special honour and a pleasure to welcome you as Director General of the Ruder Bošković Institute today at International Conference on the Applications of the Mössbauer Effect - ICAME 2013 in beautiful Opatija. Allow me to express my special appreciation to professor emeritus Dénes Lajos Nagy, the Chair of the International Board on the Applications of the Mössbauer Effect for joining us here today and for choosing the RBI as ICAME2013 host.

To our eminent speakers and scientists who have come from all over the world, I bid you a very warm welcome to Croatia. We are honoured to have you here with us. It is indeed a great honour and a privilege for the Ruder Bošković Institute to host this prestigious international Conference. This is yet another credit to the work of our scientists and our Institute.

I am particularly proud to say that RBI, too has a long tradition in the investigation of the application of Mössbauer effect, as our dear Conference Chair, RBI scientist emeritus and our dear colleague Svetozar Musić has reminded me. In the fifties of the last century professor Vladimir Knapp and professor Ksenofont Ilakovac worked on the problem of nuclear resonant scattering of gamma rays, and a little later RBI professor emeritus Ante Ljubičić, too came in contact with Mössbauer effect. These distinguished scientists focused then on other fields of nuclear physics, while it was our dear colleague Svetozar Musić who established Mössbauer spectroscopy at the Ruder Bošković Institute as a permanent method. Together with his colleagues he has published over 100 scientific studies in which Mössbauer spectroscopy was applied. Allow me to pay special thanks to our scientist emeritus Svetozar Musić for his dedication and remarkable work at the RBI.

Last, but not least, I would like to specially thank all the organising and international programme committee members as well as International Advisory Committee for their dedication to the organisation of this conference. They have put together a truly unique programme and I believe you will find it inspiring and stimulating for your future scientific

accomplishments. I am also sure you will enjoy meeting up with old friends and making new contacts.

Welcome to Opatija. I am sure you will be seduced by its beauty.