

# The 24th international conference on advances in Liquid Scintillation Spectrometry (LSC2020), October 18–20, 2021, Shenzhen, China

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The International Conference on Advances in Liquid Scintillation Spectrometry (LSC2020) was held October 18–20, 2021 in Shenzhen, China, it is the 24th edition of the LSC series conferences which started in 1957, and the first time in China and Asia.

LSC2020 is co-organized by Shenzhen Technology University, Laser Fusion Research Center and Southwest University of Science and Technology, and chaired by professor Ruan Shuangchen, the President of Shenzhen Technology University, Professor Philippe Cassette from Sofia University in Bulgaria, and Professor Gu Yuqiu from Laser Fusion Research Center. Due to the pandemic of COVID-19, the LSC2020 conference was organized in a combination mode of on-site and online.

There are over 240 researchers from 16 countries participated in the conference, among them 170 participants from China and 70 scientists attended the conference on site. Overall 84 contributions were presented in the conference, including 11 plenary, 19 invited lectures, 40 oral and 17 posters presentations. 15 sessions on the topics of the liquid scintillator development and applications, particle detection technology, and radionuclide metrology were organized, they are summarized in the below table. All presentations can be found in the conference website (<https://cloud.yiyum.com/?sid=1374&mid=362&v=100>), the video records of all oral presentations are available (<https://cep.sztu.edu.cn/info/1019/2097.htm>).

In the opening ceremony, professor Ruan Shuangchen, the president of Shenzhen Technology University gave opening and welcome speech, Professor Philippe Cassette

reviewed the history of the LSC series conference and introduced the main topics of LSC2020, Professor Hou Xiaolin presented the gratefulness to the local organizers for their great effort for organizing this conference in the tough pandemic period.

Program	Session chair
Opening ceremony	Leifeng Cao
Plenary session 1–4	Leifeng Cao, Xiaolin Hou, Philippe Cassette, Yuqiu Gu
Topical session 1–5: LSC applications in environmental, nuclear chemistry and others	Zhilin Chen, Xiongxin Dai, Tsukasa Aso, Yuchi Wu, Sizhong Wu
Topical session 6: LSC in particle detection	Chao Tian
Topical session 7–8: New development on LSC	Denis Bergeron, Steffen Happel
Topical session 9: Plastic Scintillator and application	Jose F. Garcia
Topical session 10: Radionuclide Metrology Using LSC	Alex Tarancon
Closing ceremony	Xiaolin Hou

In the closing ceremony, Prof. Cao Leifeng summarized the conference progress and achievement, Professor J.F. García, Professor Philippe Cassette and Dr. Liu Haoran shared their experiences and feelings to the conference, they appreciated the conference organizers for their great effort making this conference very successful and fruitful. Finally, it was announced that the next LSC conference will be hold in 2024 in Southampton, UK. The organizer of LSC2024, Professor Phillip Warwick from Southampton University, introduced the preliminary planning for organizing next LSC conference in 2024.

Liquid Scintillation spectrometry (LSC) is an important radiometric technique for measurement of radionuclides. Compared to the newly developed techniques, such as

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**Fig. 1** Opening Speech by Professor Ruan Shuangchen



**Fig. 2** Closing Ceremony chaired by Professor Hou Xiaolin

accelerator mass spectrometry and ICP-MS, LSC technique has been developed for more than 60 years and considered as a traditional and mature technique. However, it is still a competitive and often used technique for the measurement of many radionuclides, especially for the short-lived and

low-energy beta and electron capture decay radionuclides, even alpha emitters, such as  $^3\text{H}$ ,  $^{55}\text{Fe}$ ,  $^{89}\text{Sr}$ ,  $^{90}\text{Sr}$ ,  $^{93}\text{Mo}$ ,  $^{222}\text{Rn}$ ,  $^{241}\text{Pu}$ , etc. The LSC technique is still widely used not only in the nuclear science, but also many other fields, such as environment, geology, archeology, biology, chemistry, etc. The development and improvement in the LSC instrumentation and methodology are continued in the recent years. Some remarkable progress on the LSC methodology has been achieved and some of them have been presented in the LSC2020 conference. TDCR (triple-to-double coincidence ratio) based miniature and portable LSC instruments has being developed and optimized, application of TDCR based LSC for the Cherenkov counting and measurement of electron capture decay radionuclides through Auger electrons were also improved and optimized. Plastic scintillator based LSC technique has been rapidly developed in the recent years, which can get rid of the utilization of liquid organic scintillator, but still using the ordinary LSC instrument for measurement, the new progress on the measurement of alpha emitters using this technique was developed and verified. Meanwhile integration of extraction chromatographic separation and plastic scintillator makes this technique more attractive for on-line analysis. Development on new scintillation cocktail for improving the detection of low-energy beta emitters was also progressed. Besides the conventional application fields of LSC such as environmental radioactivity and radio-pharmaceutics, its applications in detection of neutrons and antineutrinos and applications in fusion neutron spectra measurement and laser nuclear physics were highlighted and demonstrated in the LSC2020 conference. However, there are still some challenges in the LSC methodology and its applications. A new generation environment friendly scintillation cocktails needs to be developed to avoid using the restricted toxic organic compounds; new techniques for further suppressing background and improving stability of measurement for determination

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**Fig. 3** Group Photo of Offline Participants of LSC-2020 Conference at Shenzhen, China

of continuously decreased-level radionuclides (e.g.  $^3\text{H}$ ) in the environment (e.g. deep seawater in open sea), and miniature LSC instrument with low background for field measurement are expected. These aspects will drive the LSC to be developed further for improving its competitiveness in various application fields.

Many colleagues have dedicated great contribution to make this conference finally hold in Oct. 2021, We want to express our sincere appreciation to all members of the organizing committee and scientific committee for their effort to prepare this conference, the chairs of the program committee and session chairs for their fruitful work making the conference went smoothly and successfully.

We received a numbers of full papers that presented in the LSC2020 for consideration for publishing in the conference's proceedings, among them, 17 full papers were selected for publication, they are presented in this issue after reviewed by at least two independent reviewers through JRNC's regular review procedure. We appreciate all reviewers for their professional review and great contribution.

Lastly, we would like to thank all the participants and sponsors for their contributions to the conference, and looking forward to see you physically in LSC2024 in Southampton.

**Guest Editors:**

Shuangchen Ruan, Chair of LSC2020, Shenzhen Technology University, China.

Yuqiu Gu, Co-Chair of LSC2020, Laser Fusion Research Center, CAEP, China.

Xiaolin Hou, Chairman of Scientific committee, LSC2020, Technical University of Denmark, Denmark.

Bo Cui, Member of Program Committee, LSC2020, Laser Fusion Research Center, CAEP, China.

Yuna Liu, Member of Program Committee, LSC2020, Editorial Office of High Power Laser and Particle Beams, China.

Wei Qi, Laser Fusion Research Center, CAEP, China.

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