

2014 ASMS Ion Trap Interest Group Workshop Report

Title: Have quadruple ion traps passed their prime time?

Date and location: Wednesday, June 18, 2014, 5:45 -7:00 pm, Room 337

Chaired by: Yu Xia (Purdue University)

Attendance: 100-120

Workshop Summary:

This workshop was organized with panel-guided discussions on important topics relevant to the future development of ion traps. Based on the collection of suggestions before the workshop, four main topics were chosen: 1. *Ion trap as a mass analyzer – What are the current critical technical issues and major advancements?* 2. *A battle with high-res mass analyzers – competitiveness of ion trap instruments and redefinition of their roles?* 3. *Ion trap as a reaction/storage vessel – What are the unique capabilities for chemical analysis?* 4. *What are the future directions or application areas that ion traps are especially suited for?*

Four panelists participated in the workshop, including: Prof. Daniel Austin from Brigham Young University, Dr. Michael Guana from AB SCIEX, Dr. Ralph Hartmer from Bruker Dalton GmbH, and Prof. Zheng Ouyang from Purdue University. Each panelist used about 5 -10 min to discuss one or several of the topics listed above using PowerPoint slides; while the attendees' questions and discussions were shepherded around those topics.

Yu Xia started the workshop with the background and introduced the main topics for panel discussion. Dr. Austin talked about several aspects that technical advancements could lead to improved analysis performance for ion traps. These included the better waveform stability (RF or digital), more precise machining/alignment, further optimization of the trapping field, and better understanding/management of space charge. Dr. Guana showed a linear ion trap device which could effectively reduce the adverse effect on mass analysis from space charge. He also showed an idea of using ion trap arrays for simultaneous mass analysis for segmented mass ranges. This approach may improve the sensitivity and throughput of ion trap instruments. Dr. Harmer emphasized on the diverse capabilities of ion traps besides the mass analysis such as being used as ion manipulation/storage device for ion activation and dissociation and their applications in bioanalysis. Dr. Ouyang raised the point that future ion trap development can well benefit from the unique capabilities of ion traps, such as performing tandem mass spectrometry, operating at higher pressures, being able to be miniaturized, etc. He gave an example of miniature ion trap system for analysis of bio-fluid samples for clinical applications.

The interactions and discussions among the panelists and attendees were effective and heated. For instance, Richard Yost suggested that the ion trap might have reached a mature stage and thereby the instrumentation development is slowing down. John Syka emphasized the continued and consistent contribution to the chemical and biological analysis by a large number of ion trap instruments in use currently. Juan Fernandez De La Mora proposed a combination of ion mobility with ion trap as a new direction for instrumentation. Ray March encouraged a continuous education on the fundamentals of the ion trap.

The attendance met the expectation and reflected the lasting interest of ASMS members in ion trap development and applications. The workshop concluded with a reminder to send suggestions for next year's workshop agenda to Daniel Austin at (austin@chem.byu.edu) or Yu Xia at yxia@purdue.edu.