Lithium in the Universe: to Be or not to Be?

Monte Porzio Catone, November 18-22, 2019

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FOREWORD

Among all the chemical species in the Universe, lithium is definitively the one most investigated, for its extraordinary capability of playing a relevant, often even crucial, role in several astrophysical contexts, involving objects and structures of different dimensions, spanning a wide range of evolutionary time scales and distances. The interest in lithium is thus common to diverse communities, ranging from scientists involved in Solar studies to physicists investigating the origin of the Universe, starting from the Big Bang.

Lithium, the heaviest stable element synthesized just minutes after the Big Bang, is currently at the center of a lively debate, focused on understanding the so called ”cosmological lithium problem”, to understand the well known discrepancy between the expectation from Big Bang nucleosynthesis theories and the lithium abundances observed in old, metal-poor stars, that should reflect the primordial lithium production. Furthermore, lithium is a key element used to reconstruct the formation history of the Milky Way. Additionally, it gives valuable information on the mixing and nucleosynthesis processes occurring inside stars.

The conference *”Lithium in the Universe: to Be or not to Be”*, held at the Observatory of Rome, was the occasion to gather scientists active in all the fields in which lithium plays a relevant role, to stimulate open discussion on all these topics. The conference was particularly timely, given the significant steps forward recently done in the determination of precise rates of the nuclear reactions involving lithium and beryllium and on the impressive improvements in the capability of modelling lithium in stellar spectra and evolution, owing to the development of more realistic 3D models.

The meeting was structured into five sessions, focused on Big Bang nucleosynthesis, lithium in stars, stellar clusters and galaxies, and an observational session where the recent results and the improvements in the techniques developed to infer the surface lithium abundances in stars were discussed. There were a total of 58 oral presentations and 10 posters. It is a pleasure to thank all of the participants for the high quality of their contributions. The organizers wish to thank Constantin Delyannis, Brian Fields and Rob Jeffries who, together with Andreas Korn and Gabriele Cescutti, headed an interesting and stimulating final round table, to discuss the current and future observations in the fields of research addressed during the meeting.

The organizers are particularly indebted to Dr. Angelo Antonelli, Director of the Observatory of Rome, for the logistical and financial support given to the organization of the conference. We acknowledge the financial support received by INAF and the sponsorships by ChETEC and JINA, used to ease the participation of scientists from all over the world. The success of this conference is largely due to the huge work done by Dr. Giuliana Giobbi, of the Rome Observatory, chair of the LOC, who managed the organization of the entire event with great professionalism and enthusiasm.

Gabriele Cescutti, Andreas J. Korn and Paolo Ventura