

SPECIAL SESSION SP4 @ EWASS 2013

The Origin of Interstellar Dust

Turku, Tuesday July 09, 2013

Organizers: Patrice Bouchet & John Danziger

Supernovae are responsible for seeding the interstellar medium with heavy elements, and we know that at least some produce interstellar dust. Because of the huge IR fluxes reported in galaxies at cosmological distances and its supposed origin from heated dust, understanding this process is clearly one of the most important issues in astrophysics. Furthermore, astronomers have long been puzzled about why key elements for the formation of planets and ultimately life (such as carbon, oxygen and iron) are so widely distributed throughout the Universe; only 2 billion years after the Big Bang, the remotest regions of intergalactic space have been enriched with them. Superwinds produced by the explosions of many supernovae that occur during an intense burst of star formation early in the galaxy's life may be the answer to this puzzle. Supernova explosions also influence the evolution of galaxies through nucleosynthesis but also by energising galactic winds which remove gas from a galaxy and inhibit further star formation.

It seems therefore that, acting in both ways, supernovae are key agents in the process of Life. The discovery of dust condensation in the ejecta of several supernovae established that dust can, in fact, form in the ejecta of a type II SN. However, the mass estimates ($M = 0.2 - 2 \cdot 10^{-3} M_{\odot}$) fall short by a factor 100 of those demanded by the hypothesis that SNe are major source of interstellar dust, which therefore requires that the bulk of the grain formation would occur later. It is argued by some that recent observations with the Herschel satellite point to the presence of an enormous amount ($0.4 - 0.7 M_{\odot}$) of cold dust ($T \sim 20$ K), but this interpretation is challenged by others. Still, it remains doubtful (but unproven) that the dust can survive when a reverse shock propagates into the dusty ejecta: a new phase of condensation may follow this event, or the surviving grains may re-accrete refractory elements immediately after the shock passage.

Dust formed during an earlier epoch could be different from that formed at a later time, but the nature and composition of dust at any distance is not presently understood. Furthermore the evidence of dust formation in the ejecta of SNe has been confined to only a small number of objects. To investigate whether supernovae produce much of the interstellar dust and its composition is an important and challenging astrophysical problem.

The aim of this special session (3 x 1.5h) is therefore to address specifically the fundamental question of the dust formation in the Universe both from a theoretical and observational point of view, taking advantage of current and planned European observing facilities. Invited speakers are presently:

- Isabelle Cherchneff (Univ. of Basel)
- Rubina Kotak (Queen's University, Belfast)
- Mikako Matsuura (UCL, London)

- Jens Hjorth (Neils Bohr Institute, Copenhagen)

Everyone interested to present in our Session please:

- look at <http://www.astro.utu.fi/EWASS2013/> for general information;

Registration and abstract submission MUST be done via the EWASS web-pages:

<http://www.astro.utu.fi/EWASS2013/registration.php> and

<http://www.astro.utu.fi/EWASS2013/abstracts.php>

We have been able to extend the early bird registration (350e) until 8 May. Remember that lunches are always included to the registration price! The registration will be closed 30 June. This is also the deadline for payments. If you wish to receive a receipt of your payment, please contact the Congress Office congress-office@utu.fi

2. Abstract submission will be closed 30 April.

Both oral and poster contributions are welcome. The SOC shall decide about acceptance of all contributions and their form (poster, short oral, possible longer oral) by May 15, 2013. Oral contributions that are not selected due to insufficient time slots, can be presented in poster format during the first poster session of the EWASS week (Monday to Wednesday); a short poster presentation in our special session is planned. For further information, please check for updates on our web-site, and do not hesitate to contact us at this e-mail address.

NB: due to some health problems of P.B. this announcement appears very late, for what we sincerely apologize.