The Life Cycle of Dust in the Universe

Observations, Theory, and Laboratory Experiments

November 18-22, 2013 Taipei, Taiwan
WWW.ingram.com/lcd2013

This meeting aims to address the life cycle of dust in the Universe, which covers the formation, evolution and destruction of dust in a range of environments, ranging from the smallest to the largest scales. Bringing together observational and theoretical astrophysicists as well as meteoricists and experimentalists will allow for a cross-disciplinary dialogue.

Cosmic Dust

Copenhagen 2018

Origins, applications & implications

11–15 June 2018

Topics: Observational constraints—Laboratory studies—Molecules and dust—Production by supernovae, massive and low-mass stars, and the ISM dust cycle—Dust in the early universe, as a probe in galaxies, in AGN as a tracer in the MW and local galaxies—Grain growth and planet formation and debris disks; Dust in the Solar System

Speakers: Susanne Aalto, Almudena Alonso-Herrero, Mike Barlow, Kenji Bekki, John Bradley, Jan Cami, Annalisa De Cia, Icke De Leeuw, Carsten Dominik, Bruce Draine, Maud Galametz, Sebastian Hönig, Susanne Höfner, Alex Ivezic, Cornelia Alagi, Margaret Meixner, Karin Sandström, Raffaella Schneider, Matt Smith, Sander Shinivasan, Zahed Wahhaj, Gail Zasowski

SOC: Anja C. Andersen, Ann Nguyen, Daniel Amsu, Daniele Calzetti, Darach Watson (Chair), Ciska Kemper, Haki Gomez, J. D. Smith, Joao Alves, Karl Gordon, Takuya Nozawa, Thomas Henning

LOC: Anja C. Andersen, Christa Gell, Darach Watson, Francesco Valenzona, Jens Hjorth, Jes Jørgensen, Sami Dhb, Troels Haugebo, Georgios Magdis
Sources of dust

AGB stars:
Less important?
Chemically interesting

ISM:
Denser parts of diffuse ISM
Calculations
Lab experiments
Chemistry of ISM dust?

Supernovae:
0.1 - 1.0 $M_{\text{Sun}}$
~20 years
Destruction by reverse shock?

Formation pathways:
From molecules to dust: PAHs, DIB carriers, fullerenes, silicate nanoparticles
Composition & properties

Where is the iron?

Where is the oxygen?

Carbonaceous/silicate ratio

Crystalline fraction of silicates

Are oxides an important dust component?

Forms of carbon

Comparison with laboratory and computational data
The wild diversity of dust in galaxies

- Trends with metallicity
- Differences from galaxy to galaxy
- Variations within galaxies
The role of dust in planet formation

How does planet formation depend on the dust properties?

Dust as a tracer to study planet formation

Is there enough dust to explain exoplanets?

How does the interstellar grain model connect to samples collected in the Solar System?
Future pathways

- Mid- and far-infrared spectroscopy; mid-IR polarimetry
  - JWST, SPICA, 30-m class, ...

- X-ray observations
  - ATHENA, ...

- Optical
  - SDSS-VI; GAIA; LSST;
  - UV

- Submm
  - ALMA, single-dish, …
  - Dust masses; high-z; AME; high spatial resolution observations

- Laboratory dust astrophysics
- Computational dust astrophysics
- White paper?
Thanks to Darach Watson & the local organizing committee

Next dust meeting:
North America, 2023